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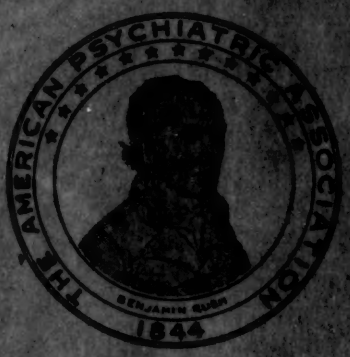

UNDER THE AUSPICES OF
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PSYCHIC MANIFESTATIONS ASSOCIATED WITH HYPERTHYROIDISM.*

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For some years we have been interested in the occurrence of mental phenomena in association with diseases of the thyroid gland, and in this paper we wish to summarize our observations and conclusions as they relate especially to the occurrence of mental phenomena in association with hyperthyroidism. We have excluded from consideration the frank forms of neurosis, the borderline mental states associated with hyperthyroidism, and the mental reactions that occur with myxedema.

The material for this study was secured from the files of The Mayo Clinic. The study comprises an analysis of the records of 143 cases of goiter, most of them cases of hyperthyroidism, in which there was some degree of mental disturbance. The cases comprising this study were secured through two entirely different channels. First, clinical cases of hyperthyroidism were selected in which definite psychotic manifestations had been observed at some time during the course of the hyperthyroidism. The patients represented by many of these cases were personally studied by one or both of us. Second, cases of hyperthyroidism in which necropsy was performed were studied. In many of these the mental manifestations were merely terminal phenomena. This latter group was secured by carefully reviewing the records of all cases of hyperthyroidism in which necropsy was performed over the 10 years from 1921 to 1931. Only those cases were included for study in which there was no associated complicating pathologic process

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which might account for the mental manifestations. The fact that such a large percentage of cases comprising this study was secured through scrutiny of postmortem records, explains the seemingly high mortality in this series of cases. The high mortality may be further explained by the fact that many of the cases in which necropsy was performed were observed prior to the use of compound solution of iodine in the preoperative and postoperative treatment of exophthalmic goiter, a procedure which undoubtedly has greatly reduced both the occurrence of crisis and operative mortality. This deduction is substantiated by the fact that the operative mortality at The Mayo Clinic in cases of exophthalmic goiter was 3.5 per cent over a period of 10 years prior to the introduction of compound solution of iodine, and has been consistently below 1 per cent in recent years.

From an historical standpoint, so much has been written about disorder of the thyroid gland as a causative factor in the production of mental phenomena that we wish to touch only on some of the facts that have a definite bearing on our present problem. Both Graves and Basedow carefully enumerated the nervous phenomena which are regarded today as so characteristic of exophthalmic goiter, and they both recognized that at times certain mental symptoms may arise which are to be looked on as manifestations related to the thyroid gland disorder. Rather early, study of disease of the thyroid gland became dominated by surgical views, and the majority of contributions came from surgeons and internists, without any special stress being placed on the mental reactions. The few early psychiatric studies, such as those of Packard, were made in state institutions, and dealt with chronic cases of an institutional character. Thus, the results were of rather limited value. The material studied prior to the introduction of tests of basal metabolism must also be reviewed with care, for often the diagnosis was uncertain, and adequate criteria were not available for identifying borderline cases.

The more common nervous phenomena associated with hyperthyroidism are so well known that they need little discussion. However, there is considerable controversy as to whether these nervous phenomena are due to dysfunction of the thyroid gland or are in part an expression of a " thyroid constitution " the result of a more protean disturbance.

At present there is no unanimity of opinion regarding the classification of mental disorders associated with disease of the thyroid gland, and it is probably true that until the underlying causes of dysfunction of the thyroid gland are more fully understood, there is little likelihood of agreement being reached regarding the mental disturbances involved. Some writers still believe that one may speak of a thyrogenous psychosis, whereas others maintain that there is no relationship between the thyroid gland and mental manifestations. The more commonly accepted view is that dysfunction of the thyroid gland tends either to predispose to mental disorder, or, conversely, that persons of neurotic make-up are more susceptible to disturbance of the thyroid gland. There is no question that, given the proper setting, both from a physiologic and a psychologic standpoint, a certain vicious cycle is formed. Just what goes to make up this cycle is none too clear, but it may be accepted that proper medical or surgical intervention may interrupt it.

In undertaking a study of this kind, it is essential to follow some definite classification of disorders of the thyroid gland. We have followed Plummer's clinical classification of disease of the thyroid gland. From clinical experience we believe that it is the most comprehensive and practical of any classification employed today. H. S. Plummer's nomenclature of disease of the thyroid gland includes the following classification of goiter: (1) diffuse colloid goiter, (2) adenomatous goiter without hyperthyroidism, (3) adenomatous goiter with hyperthyroidism (hyperfunctioning adenomatous goiter), and (4) exophthalmic goiter. In this paper, the term hyperthyroidism is used to denote the clinical manifestations resulting from both exophthalmic goiter and hyperfunctioning adenomatous goiter.

First, we shall attempt to review each type of goiter, with its associated mental phenomena, before analyzing the mental manifestations in detail. However, it must be recalled that at times it is very difficult or impossible to distinguish cases of simple goiter, with associated frank neurosis, from cases of hyperthyroidism with mental manifestations. Aschaffenburg is specific in this regard, and states that symptoms of exophthalmic goiter which are called functional often are in reality symptoms of hyperthyroidism.

Material.

This study comprises an analysis of 143 cases in which the records are sufficiently complete to give accurate data. From the psychiatric standpoint the cases may be divided into the following general groups: toxic exhaustion psychosis, 54 cases; acute delirium reaction, 48 cases; manic depressive reaction, 31 cases (includes seven cases of symptomatic depression); miscellaneous mental states, 10 cases (includes two cases of dementia præcox, two cases of paranoid reaction, and six unclassified cases).

Classifying the cases according to type of goiter and associated mental disturbances the following grouping appears:

1. Exophthalmic goiter with various mental states, namely, with toxic exhaustion psychosis, 48 cases; with acute delirium, 27 cases:

TABLE 1.

Distribution by Sex and Age.

	Age, years.								
	1 to 10	11 to 20	21 to 30	31 to 40	41 to 50	51 to 60	61 to 70	71 to 80	Total
Females	1	5	11	16	35	25	14	1	108
Males	..	2	3	3	9	12	5	1	35
Total	1	7	14	19	44	37	19	2	143

with manic depressive reaction, 23 cases, and with miscellaneous mental states, six cases; in all, 104 cases.

2. Adenomatous goiter with hyperthyroidism, accompanied by various other states, namely, by toxic exhaustion psychosis, six cases; by acute delirium, 21 cases; by manic depressive reaction, three cases; in all, 30 cases.

3. Adenomatous goiter without hyperthyroidism, accompanied by one or the other of two states, namely, by manic depressive reaction, five cases; by miscellaneous mental states, two cases; both together, seven cases.

4. Diffuse colloid goiter together with miscellaneous mental states, two cases.

The 143 cases may be divided according to sex and age as is shown in Table 1. The ratio by sex was three females to one male,

which is the same incidence by sex as that seen in cases of hyperthyroidism. Mental manifestations occurred most frequently among patients who were in the fifth and sixth decades of life; patients of these ages comprised 56.6 per cent of this series. Hyperthyroidism, likewise, occurred more frequently among patients of these two decades. However, we noted the occurrence of mental manifestations among patients as young as five years of age and as old as 72 years of age.

No special attempt was made to investigate heredity, other than to note a family history of goiter or a family history of mental disturbance. There were, in all, 23 patients who presented a possible hereditary background for the development of disease of the thyroid gland or mental disorder. In addition, six patients had had a previous mental disturbance, which apparently was unrelated to disease of the thyroid gland. From these data conclusions could not be drawn regarding a hereditary tendency for disease of the thyroid gland or for the occurrence of mental symptoms.

Material Considered from the Standpoint of Disturbance of the Thyroid Gland.

Exophthalmic Goiter.—This group comprised 104 patients. Operative procedures were carried out in 85 cases, with 34 recoveries and 51 deaths. Due to the serious condition of the patients, operative procedures were deemed inadvisable in 19 cases; death resulted while these patients were in hospital in eight cases. Thus, there was a total of 59 deaths in this group of 104 cases, a mortality rate of 57 per cent.

This group may be further divided into cases in which mental manifestations occurred prior to any operative procedure, cases in which mental manifestations followed some type of operative procedure, and cases in which mental manifestations both preceded and followed operative procedures. In the last instance, following recovery from a preoperative mental disturbance, the patient had been precipitated into a second mental disturbance following some type of operative procedure. Psychic manifestations had occurred in 55 cases before operation, resulting in death in eight cases. The remaining 47 patients recovered from their psychic disturbance under medical care and were eventually operated on; 28 of them

recovered, and 19 died. In 38 cases in this group in which mental symptoms had been absent before operation, definite mental manifestations developed following some type of operative procedure; recovery ensued in 12 cases and death occurred in 26 cases. Of the 11 patients who had mental manifestations both preoperatively and postoperatively, five recovered and six died.

The operative procedures varied from simple injection of hot water, or ligation, to a more radical procedure such as lobectomy or subtotal thyroidectomy. Many of the patients were seen at a time prior to the introduction of compound solution of iodine in the preoperative and postoperative treatment of exophthalmic goiter, and, too, many of them were subjected to multiple operative procedures. In the days before iodine was used, it was not unusual to observe a case of exophthalmic goiter, considered to be mild, and hence to present a good operative risk, in which the patient was precipitated into a state of crisis by some acute febrile reaction, such as acute follicular tonsillitis, or by some simple operative procedure, such as injection of hot water or ligation.

From the figures of the group of cases of exophthalmic goiter, 72 per cent come under the general heading of acute toxic psychosis, including acute delirium (26 per cent). The mortality rate for the entire group of cases of exophthalmic goiter was 57 per cent. All the deaths occurred in the group of cases classed as acute toxic psychosis. Crisis was considered to be the cause of death in two-thirds of the cases. Death in the remaining third of the cases was considered to be the result either of extensive visceral degenerative changes, or of an associated infectious process such as acute bacterial endocarditis. The degree of hyperthyroidism was graded as more intense in those cases in which the mental manifestations were classed as acute toxic psychosis, than it was in the cases that were classed as examples of manic depressive reaction or that were listed under miscellaneous mental states. There were no instances of crisis or death in these latter types. As frequently noted by Plummer, and recently commented on by Eason and Wallace, it was observed that the mortality was markedly increased during certain years, and among patients from certain localities.

Hyperfunctioning Adenomatous Goiter.—This group comprises 30 patients. Operative procedures were carried out in 23 cases, with six recoveries and 17 deaths. Because of the serious condition

of the patients, operation was deemed inadvisable in four cases; death occurred in all. In three other cases, operation was deemed inadvisable in view of the mildness of the symptoms of hyperthyroidism and the severity of the mental symptoms. Thus, there was a total of 21 deaths in this group of 30 patients, a mortality rate of 70 per cent.

Psychic manifestations had occurred in seven cases, in which operation was not performed. Four of these died. Five of the remaining patients, after showing marked improvement under medical care, survived operation and recovered. Seventeen patients in this group, who had given evidence of no mental change prior to operation, became delirious following resection of the adenomatous tissue; recovery ensued in one case, and death occurred in 16 cases. Death also occurred in the single case in which there was both preoperative and postoperative delirium.

It is interesting to note that 27 or 90 per cent of the patients had acute toxic psychosis, including the patients who had acute delirium (70 per cent). The death rate for the entire group of cases of hyperfunctioning adenomatous goiter was 70 per cent, which is 13 per cent higher than the figure for the group of cases of exophthalmic goiter. Likewise, in this group all deaths occurred among the patients who were classed as having acute toxic psychosis. In 40 per cent of the cases, death was attributed to an acute hyperthyroid reaction, very similar to, if not identical with, the postoperative crisis of exophthalmic goiter. Extensive visceral degenerative changes, or an associated acute infectious process, were considered the cause of death in the remaining 60 per cent of cases. Likewise, in this group, the degree of hyperthyroidism was graded as more intense in those cases in which the mental manifestations were classed as acute toxic psychosis than in those cases in which they were classed as a manic depressive reaction, or in which they were listed under miscellaneous mental states.

Adenomatous Goiter Without Hyperthyroidism.—This group comprises seven patients who had psychic manifestations, and in whose cases a diagnosis of adenomatous goiter without hyperthyroidism was made. The psychiatric diagnoses were manic depressive reaction in five cases, dementia præcox in one case, and a mild paranoid trend in one case. Operation was performed in the five cases, in which the condition was classed as manic depressive re-

action, with no deaths. Operation was advised against in the case of dementia præcox, and in the case in which there was a paranoid trend. So far as we could determine in this group of cases, there was no causal relationship between the goiter and the psychosis.

Diffuse Colloid Goiter.—There were two patients in this group, one of whom had dementia præcox, and the other of whom had mild depression with a paranoid trend. Both patients were sent home without operation. These two patients again represent the association of psychosis and goiter, without either condition having any special bearing on the other.

From this review it is definitely apparent that the chief concern of the psychiatrist lies in the group of patients with hyperthyroidism, including those with exophthalmic goiter, and those with adenomatous goiter with hyperthyroidism. Study of the mortality statistics in these two groups very plainly indicates that crisis and acute hyperthyroid reactions are among the most serious complications of hyperthyroidism. In the group of cases of hyperthyroidism, three types of mental reactions predominated, namely, toxic exhaustion psychosis, acute delirium, and manic depressive reaction. There were 134 cases, divided as follows: toxic exhaustion psychosis, 54 cases; acute delirium, 48 cases; manic depressive reactions, 26 cases, and miscellaneous disturbances, six cases; in all, 134 cases.

Material Considered from the Standpoint of Mental Disturbance.

Toxic Exhaustion Psychosis.—In this group there were 48 patients who were given a diagnosis of exophthalmic goiter, and six patients who were given a diagnosis of hyperfunctioning adenomatous goiter. In only four instances was there a history of a psychotic disturbance in the family, and in only two instances was there any history of a previous mental disturbance.

There were 32 deaths in this group. Most of the deaths occurred in cases in which operation was not performed, and the deaths were attributed to exhaustion resulting from crisis. Not infrequently, crisis was precipitated by an acute febrile reaction, such as complicating, acute follicular tonsillitis.

The character of the toxic exhaustion psychosis was in no way unusual so far as the psychic features were concerned, but it may

be said that the duration of the mental disturbance was relatively short, and responded more promptly to medical treatment than is usual in the toxic exhaustion psychoses generally. At the time of study a few of these cases were classified as acute mania, but in reviewing the records they appear to belong in the group of toxic exhaustion psychosis. The following is an abstract of a typical case.

CASE 1.—A man, aged 33 years, was admitted to hospital September 25, 1927, at which time a diagnosis was made of exophthalmic goiter with associated toxic exhaustion psychosis (acute maniacal delirium). One sister had died of exophthalmic goiter in a hospital for the insane. The father, who had had a goiter for six years, was addicted to the use of alcohol, and had evidenced psychotic manifestations for two months.

In 1921 the patient had first noted enlargement of the thyroid gland. In 1925, he had experienced symptoms of exophthalmic goiter, consisting of nervousness, loss of weight, and exophthalmos. Symptoms had gradually and progressively increased in severity until the patient had stopped work two weeks before his admission.

General physical examination gave essentially negative results except for the characteristic signs of exophthalmic goiter. The man was exceedingly restless and apprehensive. His mentality was clouded and at times he was irrational. He feared the doctors might operate on him. He had some vague ideas of persecution. He heard the nurses shout at him to run or they would operate on him. He also had some fleeting visual hallucinations. The basal metabolic rate was + 63 per cent. The patient remained in the hospital on medical treatment for 25 days, during which time he received compound solution of iodine, 10 drops three times a day. His temperature was normal. At the end of the period of hospitalization the basal metabolic rate was + 32 per cent. The patient was still very restless and apprehensive. It was advised that he be taken home for two months, during which he was to continue taking iodine and then was to return for consideration of the advisability of thyroidectomy.

Instead of following directions, the patient was taken to a "healer." He rapidly became worse. He was admitted to a State Hospital, November 2, 1927, in a very excited and violent state. He was extremely apprehensive, believed that he was being hunted, and had threatened to commit suicide. He stated he had heard God talk to him and tell him to live as long as he could. The patient remained very disturbed and maniacal and had to be forcibly fed. He died November 16, 1927, of exhaustion.

The majority of these patients give relatively short histories of mental disturbance. Under proper medical care, consisting of complete rest in bed, good nursing, an adequate supply of fluids and nourishment, administration of iodine in adequate doses, and the use of sedatives as needed, these patients usually improve rapidly and markedly. The patient whose case has just been reported did

very well on compound solution of iodine, but as soon as its administration was discontinued he lapsed into his former mental state and died of exhaustion.

The Acute Delirium Reaction.—Patients who have this reaction, taken as a group, are not sharply defined, but merge into the group with toxic exhaustion psychosis. We have attempted to confine to this group the patients with severe, acute delirium who either rapidly recover under medical treatment, or who die within the course of a few days, from the severity of their intoxication. It is these cases which present the one possible, definite relationship between hyperthyroidism and mental disturbance.

In this group, 27 cases were diagnosed as exophthalmic goiter and 21 as hyperfunctioning adenomatous goiter. Operative procedures were carried out in 19 cases of exophthalmic goiter and in 17 cases of hyperfunctioning adenomatous goiter. All patients who were subjected to operation, died. Seven of the 12 patients who were not operated on, died. Thus, 43 of the 48 patients died, a mortality rate of 90 per cent.

In no instance was there a history of psychosis in the family, or a history of previous mental disturbance. Most of the fatalities were the result of crisis or of an acute, hyperthyroid reaction. Delirium occurred prior to any operative procedure in 14 instances, following operation in 32 instances, and both prior to and following operation in two instances. In the latter instance, the preoperative reaction was of a toxic exhaustion type, from which the patient made fair recovery only to be precipitated by operation into crisis with an acute delirium reaction.

We have divided the cases of acute delirium into two groups: first, cases of crisis or acute hyperthyroid reaction, of which there were 37, and, second, cases in which there were complications or degenerative changes, of which there were 11. This latter group of patients may be more nearly of the toxic exhaustion type, but the shortness and severity of the reactions seem to justify placing them in the group with those who had acute delirium.

The cases in which crisis occurs are most characteristic, and also most important, and demand more detailed consideration. All these patients presented a severe degree of hyperthyroidism, although the severity of the hyperthyroidism was no index to the severity of the mental reaction. There was no way of indicating which patient

might become acutely delirious, for not infrequently severe delirium would develop after a very short period of hyperthyroidism. Other patients had prolonged intoxication before any psychic disturbance developed. It may be stated, however, that any unusual episode in the course of the hyperthyroidism, however slight, may precipitate an acute and violent reaction. All fatal cases of "crisis" present a typical temperature curve (Fig. 1).

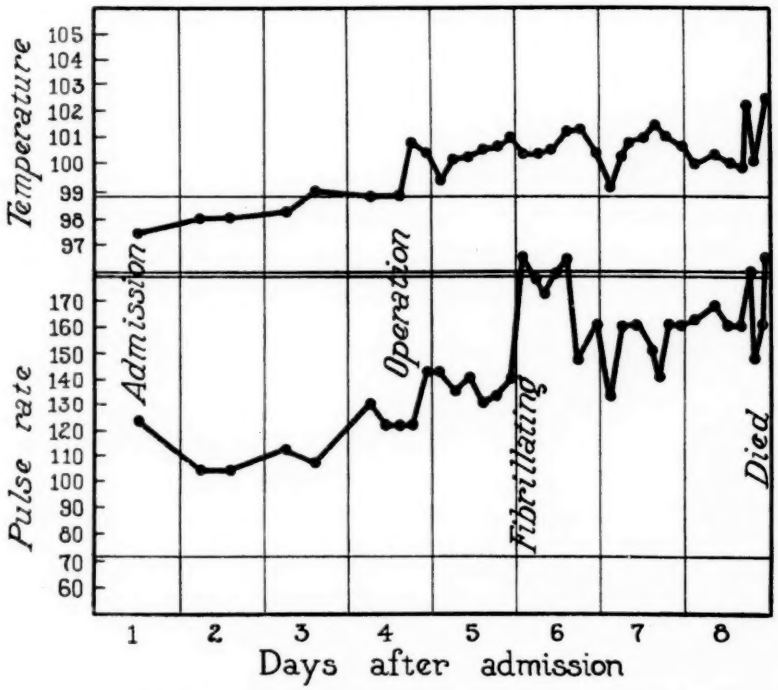

FIG. 1.—Postoperative Exophthalmic Goiter "Crisis."

The terms "thyroid crisis," "acute delirium," "hyperthyroid reaction," "thyroid storm," and "cerebral death," are all more or less synonymous, although the terms are given various shades of meaning by different writers. The typical acute delirium or crisis is characterized by a severe emotional disturbance, with clouding of consciousness, disorientation in all spheres, marked memory defect, apprehension, vague delusions and hallucinations, retardation

of speech, and various associated motor disturbances. The reactions are usually so severe as to partake more of the organic delirium than of the psychogenic type of delirium as described by Hoch. Practically all of the exophthalmic goiter crises and the acute hyperthyroid reactions of hyperfunctioning adenomatous goiter, whether preoperative or postoperative, presented the same clinical picture. So far as we could determine, there was no special difference from the psychiatric standpoint between the crisis occurring in exophthalmic goiter and the acute hyperthyroid reaction recurring in hyperfunctioning adenomatous goiter. At postmortem examination, rarely were there any findings other than changes in the thyroid gland. Occasionally terminal bronchopneumonia, some myocardial degeneration, or cerebral edema occurred, but never to an extent that might be considered primary. The following report of a case will illustrate preoperative and postoperative crisis:

CASE 2.—A woman, aged 38 years, registered at the clinic, February 9, 1931, at which time a diagnosis of exophthalmic goiter, with associated crisis and toxic exhaustion psychosis was made.

The patient stated that she had lost 20 pounds (9 kg.) during the summer of 1930. That autumn she had first noted spells of palpitation and tachycardia. Enlargement of the thyroid gland first had been noticed in December, and the gland had rapidly increased in size since that time. Concurrently, the woman had noted the onset of weakness, dyspnea, prostration, and difficulty in phonation.

Physical examination revealed the usual clinical signs of exophthalmic goiter and of a pregnancy of three to four months' duration. The patient appeared to be toxic and was greatly emaciated. She was exhausted and weak, and was experiencing great difficulty in phonation and deglutition. She appeared to be dazed, did not seem to understand questions put to her, and made but few replies. She was restless, and emotional, and memory and attention were markedly impaired. Her husband stated that he had noted the mental change for only a few days.

The patient was immediately hospitalized for further observation and treatment. The first 13 days that the patient was in the hospital, she experienced a very stormy course. During this time she was incontinent. There was a fever which on several occasions was as high as 101° F. Motor restlessness was marked. Mild, muttering delirium appeared and at times the patient was very noisy. She seemed to understand what was said to her but did not answer questions other than in few, incoherent words. The basal metabolic rates were + 82 and + 94 per cent. The patient was at her worst on the twelfth and thirteenth days, at which time her life was despaired of. At that time, the delirium was very profound. Under supportive measures and the administration of compound solution of iodine, the patient gradually

improved. She was dismissed from hospital March 9, 1931, at which time her general condition was considered to be fairly good. She stated that she had no recollection of the events leading up to her admission, nor of the major part of her stay in the hospital.

The patient returned to the clinic April 13, 1931. In the interim she had been resting at home, and had continued taking compound solution of iodine daily. At this time, she was mentally clear, was less nervous, and had gained 9 pounds (4 kg.). The basal metabolic rate was +72 per cent. Injections of hot water were made into the thyroid gland, without ill effect, on April 17 and again on April 21. Bilateral ligation of the superior thyroid vessels was performed without ill effects April 24. The patient was allowed to return home May 4, 1931.

Two weeks after returning home the patient gave birth, at seven months, to a child which died within 18 hours. The woman had an uneventful postpartum convalescence except for gradual loss of weight.

The patient returned to the clinic October 19, 1931, at which time she felt fairly well. She was nervous but was mentally clear. The basal metabolic rate was +65 per cent. Right lobectomy was performed October 27, 1931. The temperature chart (fig. 1) illustrates the patient's poor reaction to the operation. The first day following operation she was very restless, and her pulse rate and temperature were increased. October 29, the patient became acutely delirious, exceedingly irrational, very active, and disoriented. She rapidly grew worse. October 31 there was evidence of beginning pneumonia, and on that day the patient died. Necropsy disclosed diffuse parenchymatous hypertrophy of the thyroid gland in addition to the beginning bronchopneumonia.

This case typically illustrates the preoperative and postoperative reactions so frequently seen in severe hyperthyroidism. The preoperative reaction was of the nature of a toxic exhaustion psychosis, unrelated to the pregnancy. The postoperative reaction was of the nature of an acute delirium such as is seen in crisis or acute hyperthyroid reactions.

The acute hyperthyroid reaction occurring in cases of hyperfunctioning adenomatous goiter, and crisis occurring in exophthalmic goiter, are very similar, both as to symptomatology and as to their course. Such reactions characteristically occur within 48 hours following operation, and rarely last more than four or five days. As a rule, if the reaction continues over that period, recovery ensues. It is exceedingly rare for such a reaction to occur after the fourth postoperative day. Mental manifestations arising after the fourth postoperative day are either of the toxic exhaustion type or of the type of manic depressive reaction. In either group the presence of degenerative visceral changes makes the prognosis increasingly grave.

The Manic Depressive Group.—Some writers, Chvostek, for instance, found that manic depressive psychosis was the most common psychosis associated with disease of the thyroid gland. Our experience has been the contrary. We had 26 patients who would fall in this group, 23 of whom had exophthalmic goiter and three of whom had hyperfunctioning adenomatous goiter.

Of the 26 cases in which there was definite hyperthyroidism, it was found that in four there was a family history of insanity, whereas 10 patients had had previous attacks of manic depressive psychosis. The reaction, in the cases of exophthalmic goiter, and in those of hyperfunctioning adenomatous goiter, so far as could be ascertained, was similar. Fifteen of the 26 patients were operated on, recovery resulting in 12 and death in three. No patient was subjected to operation while markedly disturbed mentally. In the three cases in which death had occurred, the patients had suffered from a preoperative psychosis from which they had entirely recovered at the time of operation. Of the 14 patients who had preoperative psychosis, 10 had suffered from one or more previous mental episodes. The depressive type of reaction was the more frequent type of disturbance. In a few cases, in which there still was a moderate degree of depression at the time of operation, the mental condition was not aggravated by operative procedures. Three patients who had had mild depression, which had improved under medical care, were precipitated into severe mental disturbance as a result of the operation.

It is certainly true that a patient with hyperthyroidism who has a manic depressive tendency may be precipitated into psychosis either as a result of hyperthyroidism or by some type of operative procedure. One patient who had suffered from two attacks of hyperthyroidism at intervals of 10 years, and had required operation, was precipitated into acute psychosis with each attack. It may be said that in some of these instances the psychosis was definitely the result of the hyperthyroidism, although in no way characteristic of the disease.

In seven instances, the patients had a mild symptomatic depression. There had been no previous attacks of depression and under proper medical and surgical treatment these patients recovered and some of them have gone as long as 10 years without recurrence of their mental trouble. To say that these patients belong in the manic

depressive group is possibly open to question, but for the purpose of this study they have been placed under this general heading.

Miscellaneous Group.—We had six patients with exophthalmic goiter, but the mental reactions were so variable that from this standpoint the patients could hardly be classified under any special heading.

Two of these patients were brought to the hospital in stupor, and died without a satisfactory diagnosis having been made. In another case, a clinical diagnosis of encephalitis was made. Necropsy in these three cases revealed diffuse parenchymatous hypertrophy of the thyroid gland and no other significant findings. These three patients are of interest, for such reactions may occur, and at times present difficult diagnostic problems, especially if hyperthyroidism is not considered. Plummer constantly refers to the cerebral manifestation of hyperthyroidism, and these cases can well be placed under such a heading.

Comment.

It is a strange commentary that one can know so much regarding the function and dysfunction of a gland, and yet have no clear conception regarding the fundamental etiology of hyperthyroidism. As Lewis has stated, it never has been possible artificially to produce a typical picture of exophthalmic goiter. Kinard has assumed that the thyroid gland is merely a link in the chain of exophthalmic goiter. H. S. Plummer was the first to call attention to the fact that exophthalmic goiter and hyperfunctioning adenomatous goiter are two distinct clinical entities. He advanced the hypotheses that hyperfunctioning adenomatous goiter is a pure form of hyperthyroidism resulting from overproduction of thyroxin, whereas exophthalmic goiter is an impure form of hyperthyroidism resulting not only from overproduction of thyroxin but also from an abnormal thyroid product, the nature of which is unknown.

The vagaries of hyperthyroidism may well attest to the protean character of this disturbance. At times the manifestations are so slight that years may pass without inconvenience to the patient, or any actual knowledge of the existence of the manifestations. It is a fact that the borderline of normal and abnormal function is by no means sharp, and that even today we have no positive criteria by which we can establish a positive diagnosis in the so-called border-

line cases. Crile's often quoted passage may well be repeated here to emphasize the point that, "there is no specific criterion whereby to establish the diagnosis in the borderline cases, that is to determine at which stage altered functions on the outer boundaries of normality ends and hyperthyroidism begins." According to H. S. Plummer, in exophthalmic goiter, "the entire nervous system seems to be in a status of hyperirritability and fatigue. The patient is restless, easily irritated, and subject to emotional outbreaks. The picture varies with the duration as well as the degree of intoxication and with certain factors that for brevity may be grouped under the heading of 'personality.' The intoxication is in many ways comparable to acute and chronic alcoholism. Tears and laughter come without the patient's knowing why. As in acute alcoholism, the person may carry a good load without its being evident. Again, it may not be evident unless the person is irritated. Once irritated the patient may be as hard to manage as a drunken soldier. The lack of assurance that is so characteristic of psychoneuroses is strikingly absent if the patient is not in an emotional mood, characteristically depressed or fundamentally of a neurotic temperament."

The patient who is suffering from hyperthyroidism, especially exophthalmic goiter, exhibits self confidence and optimism that is entirely lacking in the neurotic person. There is a varying degree of motor restlessness and nervous irritability according to the severity of the intoxication. The patient may manifest apprehension and overcerebration. The moods are changeable. At times the patient exhibits exhilaration and again depression, apparently varying with the degree of intoxication and type of personality. During a severe degree of intoxication the patient is likely to give evidence of mental confusion, impairment of judgment, memory defect, and even delusions and hallucinations. Acute delirium and even coma may occur as late sequelae of severe intoxication, as in uncontrolled crisis.

Lahey has reported an apathetic or non-activated type of hyperthyroidism which is characterized by signs of a negative character, so different from the usual hyperthyroid states. This reaction is not common in our experience, or else we have placed the patients who exhibit it with those who give evidence of mild depression. Packard

found that depression was the most common mental symptom. In our cases, apprehension was the most common psychic change.

Considerable has been written from a psychogenic standpoint in an effort to demonstrate the similarity of hyperthyroid reaction to aggravated forms of psychoneurosis, especially anxiety neurosis. Although there is no question regarding the similarity of the mental reactions, the fundamental physiologic difference is so great that the two conditions cannot be included under a single heading, especially if one recalls the physiologic manifestations of the disease. One must not pass over the psychogenic possibilities too lightly, however, for only too frequently hyperthyroid flare-ups may be seen as a result of emotional shock. Thompson has expressed the belief that "the peculiar nervous manifestations of exophthalmic goiter appear to be satisfactorily explained as exaggerations of the customary reactions of the patients, who are usually of the emotionally unstable type." Some authors speak of the thyroid personality, or as Weiss stated, "a neurotic thyrotoxic syndrome," but beyond considering the condition as a constitutional defect, there is little to say. Wholey has said that the Basedowian personality runs as true to form as the hysterical or neurasthenic personality, and has noted the not new fact, that the mental symptoms may precede the physical symptoms. Lewis has found that these patients have definite mental traits and peculiarities of behavior as intense emotional swings throughout life, episodes of erratic behavior, nocturnal anxiety, tachycardia, and infantile birth fantasies. The hyperthyroid individual is usually overactive, optimistic, and expends effort far beyond his strength, which is entirely the reverse of a neurotic person.

It is important to bear in mind that the psychic manifestations and the intensity of the hyperthyroidism are seemingly unrelated; this has been commented on by many observers. It is more than likely that the tendency to mental disturbance is an index of the nervous stability of the individual, as is also noted in fevers, alcoholism and other toxic reactions. Barker and others have expressed the belief that few, if any, patients who have goiter become acutely insane unless they have a predisposition in that direction. Birkow has stated that hyperthyroidism should suggest itself if, after an acute infection, convalescence is prolonged and the patient complains of marked exhaustion.

Foss and Jackson, in their survey of 1647 insane patients at the Danville State Hospital, found 49 cases of goiter, an incidence of 3 per cent. The two main groups of mental conditions were manic depressive psychosis in 17 cases, the dementia præcox in 12 cases. In none of Foss and Jackson's cases was there clinical evidence of hyperthyroidism. In a review of the records of 800 cases of goiter observed in a general hospital in the same locality, they found but two instances of mental disturbance. They concluded that there was no definite relationship between goiter and insanity. On the other hand, Boys found that 2 per cent of his patients with goiter were psychotic, and he believed the psychoses could be directly attributed to the goiter. Johnson, in a study carried out at the Cleveland Clinic Hospital, reported a group of 24 cases of psychosis associated with hyperthyroidism. He found that depressed states were especially common with toxic adenoma. He felt that psychosis was infrequently associated with hyperthyroidism, and that when the two did co-exist, a pre-existent psychosis was aggravated rather than caused by the hyperthyroidism. Ginsberg stated that he is in accord with many observers that the frequent occurrence of manic depressive psychosis in the course of hyperthyroidism makes this association more than a mere casual phenomenon. Although some investigators have found that thyroid deficiency plays a part in dementia præcox, the majority of writers, with whom we concur, see little but coincidence in these findings.

Most writers agree that there is no typical hyperthyroid psychosis, but that the mental reactions are readily classified into the usual, accepted groups. When we turn to the group of cases with thyroid crisis, there appears to be considerable discussion as to the cause, character, and nature of the trouble. Kraepelin, Johnson, Hammes, and others all have emphasized the seriousness of this condition. Although "crisis" is usually thought of as a postoperative phenomenon, it may occur at any time and on seemingly slight provocation. Plummer has long entertained the idea that there must be a chemical change in the brain cells to account for the severe crisis. Mayo and Plummer do not look on hyperfunctioning adenomatous goiter as being accompanied by typical thyroid crisis. They do admit that at least some of the acute deaths in cases of hyperfunctioning adenomatous goiter seem closely allied to those which take place in exophthalmic goiter crisis. According to

Boothby, "the suddenness and unexpectedness of this reaction (crisis) and its occurrence in patients who appear in excellent condition are exceedingly distressing." Death may occur within 36 hours. Numerous cases have been reported of sudden fatal crisis precipitated by the most trivial medical or surgical procedure. Bier and Roman have looked on the death in crisis as being due to a "hypothyroxamischen shock" and there is no way of predicting a fatal reaction.

It is not the purpose of this paper to discuss treatment, but it seems advisable to stress the fact that in our experience surgical intervention is contraindicated during the period of mental disturbance, in spite of the frequently reported successful operations performed during this period. Administration of compound solution of iodine in adequate doses, as advocated by Plummer in cases of exophthalmic goiter, has reduced the frequency of crisis and mental reaction very markedly.

Summary.

The relationship of mental phenomena to hyperthyroidism has been recognized since the times of Graves and Basedow. In the past, surgical domination of studies of disease of the thyroid gland has hindered progress from the psychiatric standpoint in this field, so that only in recent years has proper consideration been given to the psychiatric aspect of the problem.

In this study we have attempted to analyze the mental phenomena occurring in 134 cases of hyperthyroidism, and to determine whether the occurrence of mental phenomena can be directly attributed to the hyperthyroidism.

It is apparent from this study that hyperthyroidism is a constitutional disease which may manifest any of the usual types of psychic reaction. Thus, there is no type of psychic reaction that can be considered characteristic of hyperthyroidism. However, we found three types of mental reaction dominant in hyperthyroidism; namely, toxic exhaustion psychosis, acute delirium reaction, and manic depressive reaction.

The cases of toxic exhaustion psychosis and of acute delirium reaction constitute 91 per cent of our material. Toxic exhaustion psychosis occurred most frequently in the cases of exophthalmic

goiter, whereas the acute delirium reaction occurred in a high percentage of the cases of hyperfunctioning adenomatous goiter. It appears that hyperthyroidism may act as a definite etiologic factor in the production of mental manifestations in these two groups. The mental manifestations usually occur during a state of crisis which results during a period of severe intoxication. However, the mental manifestations do not differ essentially from those occurring in association with other states of marked exhaustion, or with other types of intoxication.

The cases of manic depressive reaction constitute the third large group of this series. Many of these patients gave histories of previous mental disturbance. The coexistence of mental manifestations and hyperthyroidism in many of these cases was probably a coincidence. However, hyperthyroidism does appear to play a part as a precipitating factor in the production of mental manifestations in those cases which fall in the class of symptomatic depression.

Undoubtedly, the nervous stability of an individual is a dominant factor in determining the occurrence of mental manifestations. Either the existence of a state of hyperthyroidism, or an operative procedure, may serve as a means of precipitating a severe mental reaction in a mentally unstable individual.

The administration of compound solution of iodine in adequate doses in the preoperative and postoperative treatment of exophthalmic goiter has prevented or controlled crisis, and hence has reduced the incidence of mental reactions. Unfortunately, the administration of compound solution of iodine has not produced similar results in cases of hyperfunctioning adenomatous goiter. The management of cases of hyperthyroidism in which there is evidence of mental manifestations is a medical and psychiatric problem and surgical interference is definitely contraindicated in the course of a severe psychic reaction.

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DISCUSSION.

DR. LLOYD H. ZIEGLER (Albany, N. Y.).—This interesting paper by Drs. Moersch and Dunlap reveals in a comprehensive way what has hitherto been suspected about the relationship of psychoses to the thyrotoxic state. Hyperthyroidism is a toxemia of varying degree. Some persons are so constituted that less toxemia would be necessary to generate a toxic psychosis or exhaustion state.

The protean features of such states are probably little different from those growing out of severe pneumonia and if the incidence were known, would probably correspond closely with that of pneumonia or other severe infections.

Of course, all of us possess in varying degree the tendency to have any one of the major psychotic reaction types. It is conceivable that the problems, physiologic and psychologic, growing out of a toxemia and profound alteration in biometabolism might remove the usual reserve between one and a potential psychosis to which the constitution of the person was inclined. Such are demonstrated in this report.

The tendency to have deliria seems reasonably independent of disposition to have other psychotic reaction. It seems greatest in children and persons with brain arteriosclerosis and is more likely to occur when the brain is definitely affected as we have seen demonstrated in the encephalitis epidemics of the last two decades in which the incidence of toxic psychoses was far greater than a comparable infection not involving the brain. A few people react by delirium with trivial etiologic stimuli.

Of all psychotic reactions, delirium is probably the one that we can come nearest to producing experimentally by the simple expedient of reducing oxygen supply.

Hyperthyroidism may well be an encephalopathy. The neuropathology of this interesting disease deserves more attention. There may also be a myelopathy associated with the disease. Tremendous motor weakness, especially in the quadriceps femoris muscles, is an outstanding feature.

I am impressed at times with the similarity between hyperthyroidism, Sydenham's chorea, strychnine poisoning and myasthenia gravis, tetany, and from the more purely laboratory standpoint, decalcification, which occurs in toxic goiter.

Having studied many patients with profound hyperthyroidism to see if emotional factors were primary or secondary as etiologic agents, it has been

my impression that neuroses in true hyperthyroidism were incidental or followed in the wake of the profound physiologic disturbance. However, there are certain features common to neuroses and hyperthyroidism which have made surgeons remove thyroid glands for the supposed relief of purely psychiatric disease. It is very discouraging to the patient to have a recurrence of the psychiatric disease or fail to recover as predicted. Hyperthyroidism and the diseases it must be truly differentiated from deserve more study by neurologists and psychiatrists, in order to prevent the ill-advised attempts at therapy. However, it is equally disconcerting to have a patient with a toxic goiter entirely under a psychotherapeutic régime.

It is a particularly important feature of the paper to have pointed out that among patients having a psychosis the surgical mortality is very high.

To Dr. H. S. Plummer, of the Mayo Clinic, a great authority on goiter, a debt of gratitude is due for introducing the widespread use of iodine in this country as a remedy preparing the patients with true Basedow's disease for surgery.

Possibly sometime we may know more about the kind of people that have toxic goiters or the circumstances that lead to the development of this state with all its problems, metabolic and emotional.

Dr. Agnes Conrad (New York, N. Y.).—One young girl admitted in delirium to the Presbyterian Hospital was expected to die within 24 hours by practically all who saw her. She had been operated on for appendicitis in another hospital without the use of iodine, and unable to eat for the intervening two weeks. As soon as the starvation was relieved, the delirium cleared markedly, though it recurred slightly following a psychogenic upset a week later. Because of the large requirement fluid and actual calories as well as iodine are of the utmost importance in the treatment of the delirium of thyrotoxicosis, I am convinced.

The question as to whether or not to operate must be considered from the point of view of the postoperative nursing, but in one rather agitated case we got excellent results after two months of hospitalization in the Psychiatric Institute, though the patient was definitely psychotic the first five days after operation.

I believe that the psychoses and neuroses are incidental, as I explained earlier, which comes first depends on the individual case. Certainly each condition can exascerbate the other.

I am interested in the percentage that the doctor reports. We also find that the manic depressives are surprisingly few in our series, which does include more paranoid reactions. We find these paranoid reactions as a slight transient tendency, which makes the patient difficult to handle, in a great many of those beyond the menopause among the women, and occasionally in a male case. Several of them have however been involutional melancholias with a rather protracted course. Those indeed have been our only stubborn psychoses in the Presbyterian and Vanderbilt clinic list.

DR. F. P. MOERSCH (Rochester, Minn.).—There is frequently a difference of opinion regarding the safest time for surgery in patients with hyperthyroidism who have associated mental disturbances. At the clinic, our surgeons have learned from experience that it is advisable to have the patients adjusted from any mental break before they undertake any surgical procedure. I know that there have been cases reported in which operation for hyperthyroidism was carried out successfully during an acute mental upset. I recall one such case in which we advised conservative measures because of the mental state, and the family removed the patient to another hospital and he was operated upon making a complete recovery. I believe such a case represents the exception rather than the rule.

We find that there is considerable danger in operating too soon if there has been any mental upset. Unless the patient is getting along very well, the operation may precipitate a crisis. Today with the proper preparation of the patient and the use of iodine, the severe crises are relatively uncommon.

STUDIES OF THE URINARY EXCRETION OF GONADAL STIMULATING SUBSTANCE IN MENTAL PATIENTS.*

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The study of the relation of the endocrine glands to mental disturbances, among other important clinical problems, has recently gained a new impetus. This has resulted from the development of methods for detecting the presence of some of the hormones in both blood and urine.

Zondek and Ascheim [1] found that during pregnancy in the human there is excreted large amounts of a substance which they called prolan B. This substance, when injected in the immature mouse or rat, produces follicular enlargement and luteinization of the graffian follicles. It was also found that large amounts of œstrin or female sex hormone were excreted at the same time.

During the climacterium in the female, they found an increased excretion of œstrin which disappeared with the menopause and was replaced in some cases by an increased excretion of a substance which they called prolan A.[2] This substance, when injected into an immature rat or mouse, produces follicular enlargement. Although there has been considerable controversy whether two independent substances exist, one producing follicular enlargement (see Fig. 4) and the other luteinization (see Fig. 3), the evidence at present strongly indicates that the gonadal stimulating substance from pregnancy urine is different from the follicular stimulating material obtained during menopause.[3, 4, 5, 6]

* Read at ninetieth annual meeting of The American Psychiatric Association, New York, N. Y., May 28–June 1, 1934.

Recent studies have shown that the follicular stimulating substance also appears in the urine of females at various periods of the menstrual cycle [7] and in small amounts before puberty. It has been reported also that small amounts are present in the urine of the human male.[8]

Since experiments had shown that the pituitary contains gonadal stimulating substances and probably plays a central rôle as a regulator of gonadal activity,[9, 10] it was believed by some that

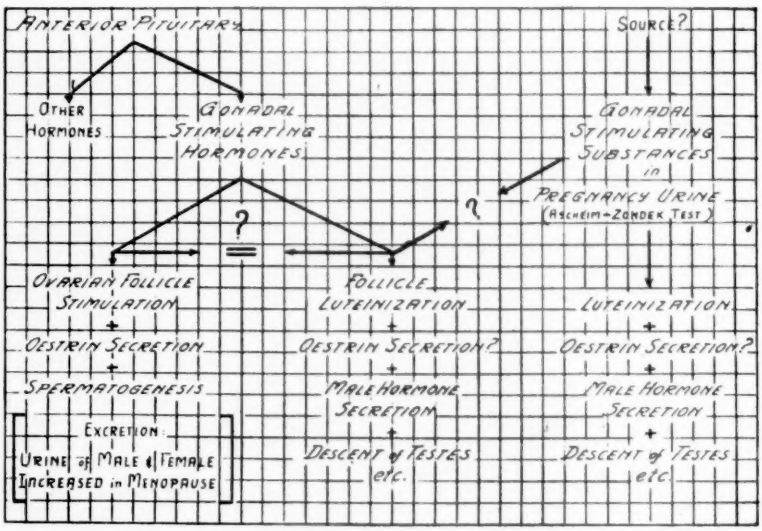

CHART 1.—Schematic Relationship of the Hormones.

the pituitary was the source of the gonadal stimulating substances appearing in the urine. The actual source of them is, however, still in doubt. In Chart 1, we have attempted to indicate in a general way some of the physiological relationships just discussed.

The frequent coincidence between the occurrence of some psychiatric disorders and changes in the sexual sphere points to the importance of studying the relation of these substances to the clinical syndromes observed. We have approached one phase of this subject by trying to determine the effect of the administration of some of these hormones upon the mental picture.[16] This paper

deals with a study of the excretion of gonadal stimulating substances in certain mental cases.

Some studies along such lines have been carried out by several investigators. Saethre [11] reported on the titration of the sexual hormones in 113 patients with mental disturbances; 62 of these were climacteric or post-climacteric neuroses (non-schizophrenic), 29 cases were neuroses accompanied by oligomenorrhea or amenorrhea in the pre-climacteric period and 22 were cases of dementia præcox, ranging in age from 25 to 35 years, who gave a history of amenorrhea of at least four months' duration. Prolan A and œstrin excretion was determined according to the method outlined by Zondek, using morning specimens of urine for the analyses and calculating the excretion per liter of urine. The shortcomings of this procedure will be discussed later.

In the climacteric and post-climacteric group, Saethre reported that 92 per cent had a marked increase in prolan A excretion, three cases had both prolan and œstrin, and two cases had only œstrin excretion. Since Zondek had found an increased prolan excretion in only 15 per cent out of 70 cases which he studied, Saethre suggests the possibility that this may have been due to the nature of the clinical material used in the study, namely neurotic and psychotic patients with severe symptoms of the climacterium. However, he states, that although a parallel between the high hormone excretion and the severity of the symptoms was not proven still it did not preclude the possibility of such a relationship.

In 44 cases in the involutional period Oesterreicher,[12] using Zondek's procedure, also found an increased prolan excretion in 90 per cent of the cases. He believes that the increased hormone excretion continues throughout the life of the individual.

Discussion of Methods and Procedure.

In the studies just mentioned, a casual morning specimen of urine was examined for these substances and then reported as so many units per liter. Such studies, however, are unsatisfactory since the substances under investigation may appear only at intervals. Furthermore, nothing is known of the manner in which they are excreted. Thus, Smith,[13] who pointed out the importance of examining total 24-hour specimens of urine daily over a period

of time, showed that an individual who was excreting approximately the same total amount of hormone from day to day continued to do so in spite of the marked increase in his urinary output resulting from the ingestion of large amounts of water. Obviously, if a casual dilute specimen of urine were examined one would have found a marked reduction in the output of hormone per liter where the actual total daily excretion was unchanged.

We have therefore tried to collect total 24-hour specimens of urine daily over a prolonged period in order to obtain a clearer picture, if possible, of the hormone excretion from day to day. Creatinine determinations were made on all the specimens in order to check up the completeness of the collections.

As regards methods, laboratory facilities did not permit the use of the alcohol precipitation method of Zondek upon total 24-hour specimens of urine daily. Doisy,[8] however, had published several precipitation methods which were more feasible and which were employed in the early part of our study.

The frequent occurrence of toxic reactions from the injection of the extracts obtained and also the necessity of centrifuging very large quantities of material led us to seek other methods. Various adsorption methods, similar to those of Doisy,[8] and Evans [14] and their coworkers, were investigated and employed in this study. Some of these methods are still under investigation and will be reported separately in a subsequent publication.

Immature rats bred from our own colony under standard conditions were used as test animals in this study. The ovaries were carefully dissected, weighed, examined with a dissecting microscope and sectioned for histological study whenever indicated. The status of the uterine horns and vagina was recorded.

The mental patients studied consisted of 10 females ranging in age from 15 to 51 years, and four males from 15 to 64 years. There were 5 normal young adult females and 1 normal young adult male, a total therefore of 20 individuals. The mental patients consisted of the following groups: 6 cases of involutional melancholia, 4 of which were females and 2 males, three cases of dementia præcox, 1 case of psychoneurosis, 1 mental defective and 1 case of psychopathic personality without psychosis. A list of the cases, the period of study of the hormone excretion and other data are given in Table 1.

TABLE 1.
LIST OF CASES STUDIED.
FEMALES.

Case No.	Age, years.	Psychiatric diagnosis.	Menses.	Days studied.	Clinical course.	Remarks.
1.....	51	I. M.	Menopause 4 yr.	70	Unchanged.	X-ray, fibroids, 47 yr.
2.....	46	I. M.	Menopause.	75	Unchanged.	
3.....	49	I. M.	Menopause Am. ½ yr.	75	Slightly Improved.	Irregular 2 yr.
4.....	47	I.M .	Menopause 2 yr.	40*	Unchanged.	2 menses 2 yr.
5.....	36	M. D. (Depr.).	Amenor. 3 yr.	85*	Unchanged.	Unilat. ovarect. 3 yr. Thyroidect.
6.....	25	M. D. (Depr.).	Normal.	65*	Improved.	
7.....	16	P-N.	Amenor. 7 m.	70	Unchanged.	
8.....	16	D. P.	Amenor. 3 m.	55	Unchanged.	Mens. ret. during study.
9.....	16	Ps. P.	Irreg. 5 yr.	75	Unchanged.	
10.....	15	D. P.	Normal.	75	Variable.	
11-15.....	21-4	5 Controls.	Normal.	40-100	.....	

* Studies being continued.

MALES.

Case No.	Age years.	Psychiatric diagnosis.	Days studied.	Clinical course.	Remarks.
16.....	64	I. M.	155	Improved.	
17.....	49	I. M.	100*	Unchanged.	
18.....	21	D. P.	95*	Unchanged.	
19.....	15	M. Def.	30 weeks.	Unchanged.	Antuitr. S treatment. Descent of testis. Studied twice weekly.
20.....	25	Control.	45	.....	

* Studies being continued.
I. M. = Involutional melancholia.
D. P. = Dementia praecox.
M. Def. = Mental deficiency.
M. D. = Manic-depressive psychosis.
P-N. = Psychoneurosis.
Ps. P. = Psychopathic personality.

Analysis of the Findings.

I. Involutional Melancholia.

Case 1, F. Co., age 51, ♀, was studied for a period of 70 days. She excreted moderate amounts of follicle stimulating hormone almost continuously during this period. On several days during this period little or no hormone was detected in the urine. This was especially noticeable during the latter part of the study and was not associated with any notable clinical change in the mental condition.

Case 2, B. Ki., age 46, ♀, was studied for a period of 75 days. She excreted continuously appreciable amounts of follicle stimulating hormone which was estimated as high as 16 to 26 rat units per day and appeared to be larger in amount than that found in case 1.

Case 3, V. Mg., age 49, ♀, was studied for 75 days. She excreted variable amounts of follicle stimulating hormone * during this period. On some days no hormone was detected whereas on other days moderate to very considerable amounts were excreted. Thus some of the ovaries from the test animals with positive reactions ranged from 23 to 87 mgs. in weight indicating the considerable variation in the amount of hormone excreted per day.

Case 4, R. Ho., age 47, ♀, was studied for 40 days. She excreted very large amounts of follicle stimulating hormone almost continuously, some of the largest test ovaries (110 mgs. in weight) being obtained in this case. However, there were several days on which no hormone was detected.

Case 16, J. Kr., age 64, ♂, was studied for 155 days. He excreted follicle stimulating hormone in moderate amounts almost at monthly intervals. This led us to suspect the existence of a monthly sex cycle in the male.[15] No unusual change in the mental state was observed at these periods of excretion. Patient improved during the period of study.

Case 17, S. Tu., age 49, ♂, was studied for 100 days. He was found to excrete small amounts of follicle stimulating hormone on two occasions with an interval of approximately 1 month (February 28 and March 26, the specimen of April 28 was lost).

* Corpora hemorrhagica and corpa lutea were obtained in a few of the test animals.

The findings regarding hormone excretion in this group have been graphically presented in Charts 2 and 3.

Thus the females in the involutional melancholia group excreted much larger amounts of hormone than the males. Also the excretion was continuous over long periods whereas that in the male was periodic and almost monthly in occurrence.

The level of excretion in the female case was apparently different in the various patients and there was some suggestion that those with more marked mental symptoms had the higher excretion levels.

The studies thus far also indicate that although the excretion of follicle stimulating hormone is increased in menopause it may not be entirely continuous in its occurrence as claimed by Oesterreicher, and again indicates the importance of continued observation of the total daily excretion.

The difference in behavior of the gonadal stimulating hormone in the male and female in the involutional period is so very marked that one may consider it significant in spite of the small number of cases studied (*cf.* Chart 2 and 3).

II. DEMENTIA PRÆCOX.

Case 10, E. Pe., age 15, ♀, was studied for a period of 75 days when the study was discontinued because the patient became uncooperative. She menstruated regularly during the period of observation. This patient had an aggravation of her mental condition at the time of or immediately following her menses. The excretion of follicle stimulating hormone occurred only on one occasion in relation to menstrual period, which is a normal finding. Owing to the fact that during this study several days were pooled for a determination, one does not know whether small amounts were excreted on some days which were not detected because of dilution by negative urines.

Case 8, F. Bu., age 16, ♀, was studied for 55 days. She had had amenorrhea for three months, menses returning one week prior to the completion of the study. The patient excreted a moderate amount of follicle stimulating a few days prior to the onset of menses. She also had excreted very small amounts on two occasions prior to this while amenorrhea was still present and during the time that she was showing some clinical improvement from the

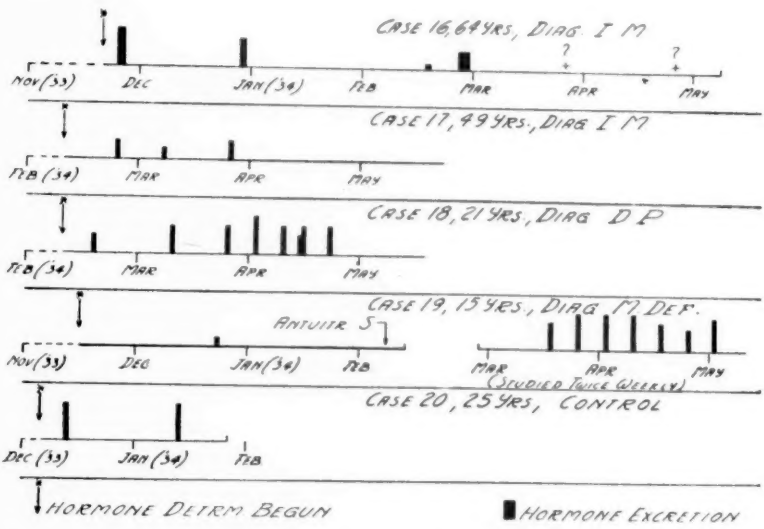

CHART 2.—Urinary Excretion of Gonadal Stimulating Substances. Males.

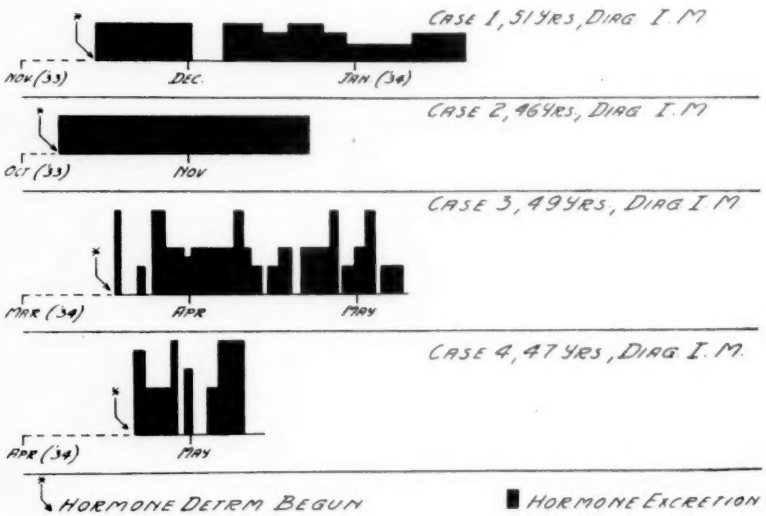

CHART 3.—Urinary Excretion of Gonadal Stimulating Substances. Female—Menopause.

standpoint of her general interests and activities (for details see Chart 4).

The increased hormone excretion was observed during the period between January 27 to 29 which was shortly prior to the onset of her menses. On January 30, the day following the increased hormonal excretion, she had a bad dream regarding her father, mother and "boy friend" and suddenly had a relapse, becoming mute, untidy and losing interest in her environment. It is interesting to consider the possible relation of the endocrine changes with those of her mental state.

Case 18, H. G., age 21, ♂, was studied for 95 days. He showed during one month out of the three months of observation a definite excretion of moderate amounts of follicle stimulating hormone at intervals of about five to six days. This was quite different from that observed in the older male patients previously described. Its physiological significance is as yet not clear and requires further study. As far as his mental picture was concerned, no notable change was observed at these special periods. The patient is being investigated further (for details see Chart 2).

III. PSYCHONEUROSIS.

Case 7, J. Di., age 16, ♀, was studied for a period of 70 days. She had normal menses until nine months after the onset of her psychosis, when amenorrhea developed which persisted during her stay in the hospital. From the psychiatric standpoint however she showed improvement before the endocrine studies were started. She excreted small amounts of follicle stimulating hormone in the beginning of the study during two periods about one week apart. After that no detectable excretion appeared throughout a period of about two months. This finding is of interest in view of the continued amenorrhea in spite of the improvement in her mental condition (for details see Chart 4).

Manic Depressive Psychosis.—Case 5, F. Ku., age 36, ♀, was studied for 85 days. She had had a unilateral oophorectomy three years ago following which amenorrhea set in and her menses did not return. This operation took place shortly before the onset of her present psychotic attack. She excreted a moderate amount of follicle stimulating hormone for a period of several days and a

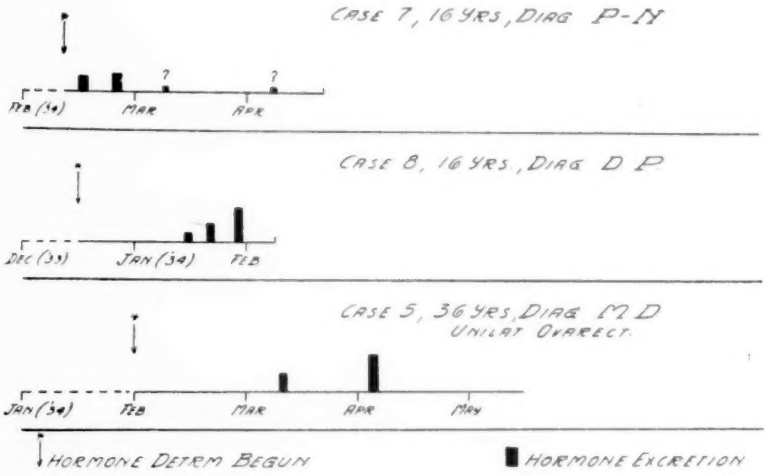

CHART 4.—Urinary Excretion of Gonadal Stimulating Substances. Female—Amenorrhea.

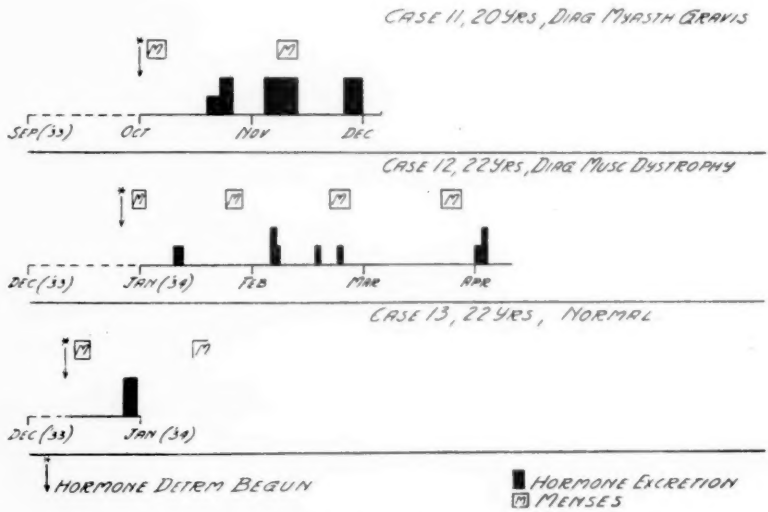

CHART 5.—Urinary Excretion of Gonadal Stimulating Substances. Female—Controls.

smaller amount three weeks prior to that period. No unusual mental changes were noted at the time at which the hormone excretion occurred (for details see Chart 4).

Psychopathic Personality without Psychosis.—Case 9, N. Rap., age 16, ♀, was studied for a period of 75 days. She had a history of irregular menses, her catamenia occurring every four to five months. During the period of study, menses occurred twice within an interval of about 24 days and no menses during the subsequent interval between November 3 to December 15, at which time the study was discontinued. She excreted small amounts of follicle stimulating hormone about a week to 10 days after each of the menstrual periods and a very moderate amount just before the study was discontinued. There were no notable mental changes observed with these periods of increased excretion.

Mental Deficiency.—Case 19, S. We., age 15, ♂, was studied for a period of 30 weeks in the out patient department. Besides the patient's backwardness, mentally, he also presented, physically, a Fröhlich syndrome with undescended testes. He received antuitrin-S, 100 R. U. daily except Sundays, following which both testes descended into the scrotum. No other notable change was observed. His urine was examined the last two days of every week. A small amount of follicle stimulating hormone was found on one occasion during approximately the first two and a half months of observation. During approximately the last month of observation, luteinizing hormone has been found in all the specimens of urine examined. This probably is due to the excretion of antuitrin-S which he is receiving hypodermatically (for details see Chart 2).

Normal Controls.—This group consisted of five young females (see Chart 5) with regular menstrual cycles and one young male (see Chart 2). There was no excretion in the female group except in the premenstrual or menstrual period and again about ten days to two weeks after onset of menstruation. This is similar to that found by other investigators. In the male subject gonadal stimulating hormone was found on two occasions with approximately a monthly interval.

We have chosen a group of representative sections illustrating the various reactions obtained in our investigation. It includes the following: an immature ovary, a normal mature ovary, and ovaries

showing the effects of injections of antuitrin-S, extracts of menopausal urine, and male urine. The figures show pure follicular stimulation resulting from the injection of extracts of menopausal urine and also follicular stimulation and luteinization resulting from the injection of larger amounts of the same material.

Summary and Conclusions.

1. A group of 15 mental patients and five non-psychiatric subjects were investigated over prolonged periods of time regarding the total daily urinary excretion of gonadal stimulating hormones.

2. Female patients in the involutional period were found to excrete large amounts of follicle stimulating hormone similar to that found in normal females during menopause. The level of excretion appeared to be more marked in the patients with the more marked mental disturbance. Contrary to the claim of some investigators, the excretion was not always continuous, nor uniform and was entirely absent on some days. No clinical change was observed on those days when such alteration in the excretion occurred.

The male patients in the involutional period were in marked contrast to the females. They excreted follicle stimulating hormone only occasionally and usually at approximately monthly intervals. This suggested the presence of a sex cycle in the male. No clinical change was observed in the periods when excretion of the hormone occurred.

3. The younger female patients were found to excrete follicle stimulating hormone only at intervals and in much smaller amounts than those of the involutional group. In one of the cases a marked aggravation of the clinical picture occurred at the time of the increased excretion which suggested a possible relation to the hormonal status of the patient.

4. Various methods for extracting the hormones were investigated in this study and some are still under investigation and will be reported subsequently.

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PROTOCOLS.

CASE 1.—F. Co., female age 51, single. The patient was usually sociable, friendly and cheerful. From early girlhood and up to the onset of her present difficulties she was essentially a "home girl," voluntarily having taken over the full management of her parents' home, not only as regards finances, but also with respect to the habits

of her parents and of her brothers and sisters. She was the oldest of four children and from a very early age had taken over most of the maternal attributes. In addition to having been the "mother" of the home, she worked for a few years during early adult life, but never relinquished her duties as leader of the household. From the age of 39-49 she was continually in charge of her father, who was incapacitated during this period. The only man with whom she had ever been at ease was her father; and her brother and sisters agreed that "she never left him." She had never had a love affair, for throughout her adulthood she tersely dismissed the question of men with the statement that she had not found her "ideal." She was not known ever to have looked or longed for "the ideal." She appeared to have been well adjusted to the rôle of mother-daughter. She was a strict moralist, particularly zealous in her religion and was exacting with respect to morality.

The menstrual cycle began when she was 13 or 14 years old and continued at regular intervals without any unusual symptoms.

In the summer of 1931, when the patient was 48 years old, her father died. She had been in constant attendance upon him for the ten preceding years. Upon his death she became restless and depressed and in an effort to get well she attempted to reestablish the daughter-mother rôle by taking charge of her brother. The transference of interests was helpful in alleviating her symptoms for a brief period; and she also gained some improvement by attaching her feelings to the family doctor. Soon, however, she began to speak of suicide—"to join my mother and father"; the death of her mother, when the patient was 41 years old, did not evoke any special emotional response. In fact, the patient herself realized that the mother's death served to bring her in much closer contact with the father.

When the patient was 47 years old she is said to have had a uterine tumor; roentgen rays were applied with the result that the menses ceased and the tumor mass (fibroid) "subsided." About a year later, shortly after the death of her father, the menstrual cycle reappeared, giving rise to an intense fear that something was wrong in the genital area; and since that time the complaints about her genitals have dealt almost exclusively with the feeling of guilt and sin. She has consistently felt that if she had married she would not have become mentally sick, would not have masturbated and would not have been so closely identified with her father. During her illness she has lost the rôle of mother and "has acted like a child" to one of her sisters. The psychiatric diagnosis was involution melancholia.

Biochemical studies from the standpoint of hormones were begun November 16, 1933, and terminated January 23, 1934. For several months prior to November, 1933, she had been at home and had been considered clinically improved. Hormonal excretions were positive daily with the exceptions about to be noted. During the many days of positive excretions the psychiatric condition varied; on some days she appeared pleasant, affable and cooperative; on others she felt weak, was retarded and depressed. There were no hormonal excretions for certain periods, during which it did not appear that the psychiatric condition had varied beyond that commonly observed in her.

Case 2.—B. Ki., female, age 47, married, one child. There is insufficient history of this patient to enable one to get a clear picture of her life prior to the onset of her present illness. She said that she had been brought up by maiden aunts who were kind to her. She had wanted to become a school teacher, a position that she held for a few years following graduation from college. She married at the age of 29 and shortly after the birth of her only child (10 months after marriage) her husband refused to support her. She claimed that thereafter she worked to support herself and her daughter for a time; she sold books of a religious and medical nature, canvassing from house to house; she travelled during her selling career from state to state. During this period she became intimate with many men, who helped to provide for her and her daughter.

She said that she had never experienced any serious illnesses. Menstrual periods began at about the age of 13, were always regular and without disagreeable symptoms. Menstrual changes that appeared to mark the onset of the menopause began in April, 1931, when she was 44 years old. Finally the menses disappeared completely and while she was under our observation there were no menses.

At the age of 46 she became psychiatrically sick, having developed a paranoid reaction; she became seclusive, felt that people referred to her as a prostitute, thought that her food was being poisoned and that she was being followed by persecutors. She spoke of electrical influences that hypnotized her. At one time she thought she was pregnant. She often became considerably anxious; she seemed to maintain a certain degree of insight, for she frequently said that her suspicions were imaginary. Sometimes the paranoid syndrome was regarded by her as a thoroughly foreign and undesirable part of herself and on these occasions she became acutely anxious and depressed. The psychiatric diagnosis was involution melancholia.

Biochemical observations (hormonal) were started September 6, 1933, and terminated November 18, 1933. During this period she excreted hormones daily. Her daily psychiatric condition remained essentially unaltered throughout the period of hormonal observation.

CASE 3.—V. Mg., female, age 49, married; there was one normal pregnancy resulting in a healthy boy, now almost 21 years old.

The patient had always been of the repressed type, with interests confined principally to her home and to religion. She had exhibited a pronounced inclination to cleanliness, scrupulosity and stubbornness. She was inordinately modest and moral and constantly exercised herself, much to the embarrassment of others, in matters of honesty, truthfulness and uprightness. Throughout her pre-marital and marital career she abhorred even veiled references to sexual topics and she has consistently remained ignorant of the common physiology of sex. She had always shown a tendency to see slights when none was intended and she frequently placed the responsibility for anything of a disagreeable character upon others.

Menses began when she was 14 and continued to be regular until the early part of 1930, when she was 45 years old. However, for about 4 years (age 43-47), she complained frequently of hot flashes. In the early part of 1930 she began to "menstruate" at intervals of about seven days; subsequently, the bleeding, though slight, was present every day for about two years, following which the menstrual cycle or any overt modification of it completely disappeared.

The beginning of the *cessation* of menstruation (spring of 1932) also marked the onset of the psychiatric difficulties that led to her hospitalization. From simple ideas of reference there developed delusions and halucinations of persecution, which were directed against the members of the church to which she had been extremely devoted. For a time she alleged that her husband was unfaithful to her and later she became self-condemnatory, placing the responsibility for her mental condition upon herself. Her illness was also characterized by pronounced emotional alterations that appeared to be related to the changes in her ideas. There were rapid shifts of mood, from antagonism against her persecutors to self-accusations and suicidal threats; the same general delusion formed the basis for the antagonism both to others and to herself, namely, that she had sinned against the church. Often she became intensely anxious, and during these periods she earnestly begged for God's forgiveness and help. At the same time she regretted that she could not act as a wife or a mother. She wanted God and her "Daddy" (her husband) to be with her "all the time." Moreover, she did not want women; indeed, the delusional and hallucinatory experiences served to keep her away from women. In brief, the psychopathology of her illness represented in a more or less vivid manner the ambivalent struggles associated with the Œdipus situation. Prior to the cessation of her menses the unconscious manifestations of the Œdipus conflict had remained shielded by a thin and fragile social "partition" of adjustment, but with the onset of what meant the loss of sexuality (in her illness she complained bitterly because she had been frigid and because she had had only one child) the inadequate and insufficient type of defense against overt expressions of the Œdipus conflict was completely broken down. The psychiatric diagnosis was involutional melancholia.

Laboratory observations from the hormonal standpoint were started March 10, 1934, and were completed May 3, 1934. During this period hormonal excretions were positive except for certain days or periods. A careful survey of her daily psychiatric condition failed to reveal any essential fluctuations throughout the period of observation.

CASE 4.—R. Ho., female, age 47, married, seven children. The patient, before the onset of the present illness, was a quiet, good-natured woman, who devoted most of her interest to her home and church. She is said to have exercised good judgment in the performance of her household duties and to have been a kind, considerate wife and mother. As a rule she showed no interests in matters outside of her family and household. Generally she was cheerful and appeared to enjoy the very restricted activities in which she engaged.

At about the age of 39 she began to have gastro-intestinal complaints, for which no well-defined pathology could be found, although she was examined by a large number of physicians. The complaints have continued up to the present time. It appeared that menopausal symptoms first appeared at the age of 40, when she was troubled with headaches, dizziness, hot flashes and changes in the menstrual cycle. The menses are said always to have been regular until she was 40 years old. During the next several years the interval between the menstrual periods became progressively longer and the individual periods were longer than usual. During the last two years she has menstruated

once or twice. Since the age of 40 she has usually been depressed. In November, 1933, the depressive symptoms became more pronounced, she was agitated and the gastro-intestinal complaints were considerably intensified. The psychiatric diagnosis was involution melancholia.

Observations from the hormonal standpoint were begun March 23, 1934, and (for this report) were terminated May 3, 1934.

During the period of observation hormonal excretion was positive on each day except March 24 and 25 and April 1, 2 and 3. This patient was not in the hospital on the days just mentioned, but it was not known to the informants that her general condition was different on those days.

CASE 5.—F. Ku., female, age 36, single. Before the onset of any of her psychiatric episodes the patient was ordinarily of a genial, sociable disposition; she was industrious at work and at play; she had a variety of interests, although they were in general of a scholastic character. She took a keen interest in her school work, knew that she wanted to become a teacher and, after graduating from college, she taught in the lower grades. She preferred to teach children and looked forward to the time when she would be married and have children of her own. Her mother and father are living and for years she has been a "home girl," although she appeared to be active outside of the home. She always regretted that she was not as sociable as she cared to be; in fact, her sociability was largely in a scholastic setting and was distinctly of an intellectual rather than of an emotional character.

The patient experienced an episode of intense depression following the death of her brother by suicide. The exact relationship seems not to be clear, for in point of time, he committed suicide when she was 15 years old and she had an episode of depression three years later. Again at the age of 19 she had an episode of depression and a third attack at the age of 32. She is said to have made a complete recovery in the interval between attacks, although as she grew older she kept regretting her lot in life; she regretted that she was not sociable, that she was not married and that she was a "home" girl.

The fourth and present attack was initiated by an attempted love affair with a man about 15 years her senior; she withdraw from a proposal of marriage and entered upon a phase of depression, during which she spoke of joining her dead brother. There was also another factor of importance in the etiology of her fourth attack. Not long before the onset she had had an appendectomy and a unilateral oophorectomy. She worried much over the latter, for she felt that since she could not have children she could never marry. Her attitude towards her mother was decidedly ambivalent; at one moment she was rude and antagonistic, and a little later she was profusely apologetic. Throughout her illness she stressed the great concern and trouble that she was causing her parents. Moreover, her mother was then an invalid and thoughts of the mother's death were in her mind. In addition to this she witnessed the death of a man at about this time. In brief, there were several allied circumstances that entered into the psychosis—the incapacity of both parents, requiring her constant attention at home; the death of a man; thoughts of marriage to a man 50 years old; alleged loss of genital function. The psychiatric diagnosis was manic-depressive psychosis.

She began to menstruate when she was 14 years old and the menses appeared regularly and uneventfully every month, until the oophorectomy, since which time she has not menstruated. Following the oophorectomy the thyroid gland enlarged and later was operated upon.

Biochemical studies (hormonal) were begun February 27 and (for this report) terminated April 27, 1934.

Positive hormonal excretions were observed on March 9 and 10 and again on April 3, 4 and 5. No noteworthy psychiatric changes were noticed prior to, during, or after the days just mentioned.

CASE 7.—J. Di., female, age 16, single. The patient, before her psychiatric illness, was generally active, alert, cheerful and friendly; she was an only child, was usually given her own way and whenever it appeared that she might be denied her requests she became stubborn and petulant. To those about her she appeared egocentric and was described as having a feeling of superiority. As a rule she was kind and obedient to her mother, but from very early childhood she outwardly expressed passivity and at times antagonism toward her father. In spite of the apparent independent attitude that she tended to convey to others, she was of the "leaning" type. The bond between her and her mother was strong. She definitely tried to assume the maternal rôle, attempting to be like the mother; her attitude toward her father was conspicuous by its passivity. She used to become mildly alarmed when she thought of the time when her parents would be dead; indeed, thoughts of the parents' death were frequent.

Moreover, she longed to have brothers and sisters; she wanted them for herself; they would be her children; of course the parents would reproduce the children—her children. It was obvious that incestuous problems formed a difficult issue with her.

When she came into womanhood, the incestuous tendencies could not be resolved by any of the many socialized means, although efforts at resolution were instituted. The briefest summary of her manner of handling the incestuous conflict is as follows. She abruptly directed her interests away from her home and gained attachments to boys and girls of her own age. For the first time she overtly discussed sexual topics with boys, but her deeper attachments were to girls. Soon, however, a triangular love situation was encountered. The patient "fell in love" with a young man who was already in love with the patient's closest girl friend. The ensuing conflict was then carried on between the two girls, the patient claiming that her girl friend was a "traitor." The emotional struggles of the patient were promptly reverted to her own parents, particularly to her mother, toward whom she expressed great hostility. She complained that her home was degrading and the probable reason for this was the fact that her mother and father had become more intimate with one another, while she, the patient, was not taken into their confidence. It was evident that she had carried back to her parents, that is, to the original source, the conflicts that she had for a brief time displaced upon her boy and girl friend. By this time she was continually confined to her home, in which strife with her parents was outstanding. The clinical symptomatology included conversion phenomena and the diagnosis was conversion hysteria.

The menstrual cycle began at 14 and was regular and uneventful until about nine months after the onset of the psychiatric disorder. The menses then ceased and failed to return while she remained in the hospital.

Biochemical observations were begun February 11, 1934 and were discontinued April 22, 1934. Improvement from the psychiatric standpoint began soon after she was admitted to the hospital (December 19, 1933) and before the biochemical studies were started the conversion phenomena had disappeared. Emotional alterations continued and had special relationship with her parents. Hormonal excretions were positive on February 16, 17, 18 and 19. On February 14 she appeared much improved; on February 15 she was careless, indifferent, untidy; on February 18 and 19 the improvement continued. It seemed that her association with another patient determined her mood and actions to a large extent. On February 24 and 25 hormonal excretions were again positive; improvement that had begun before February 24 continued beyond February 25. There were no special fluctuations in the psychiatric condition during the periods of hormonal excretion.

CASE 8.—F. Bu., female, aged 16, single. Before the onset of her illness the patient was a quiet, friendly girl, who said very little about herself and whose interests were generally confined to herself. She played with other girls, but it was noticeable that she did not exercise much initiative. She was described as "over-imaginative." Her progress in scholastic work was average.

The onset of her psychiatric difficulties (at the age of 15) was characterized by a constant tendency to leave her home, especially after she had retired for the night. At home, at the times she left were her mother and sister; the father was away working nights. When she left home she would wander about aimlessly. She was soon admitted to the hospital, where she continued to center her interests, in a passive way, at the door leading to the outside. She became almost completely inarticulate and failed to associate with any people in the environment. At times she expressed the idea that her body was being controlled by outside influences. At a later date she became spontaneously articulate, but principally to the extent of yelling and screaming her comments. The ideational content comprised intense antagonistic and affectionate remarks to her brother, whom she at times likened to fecal material, but she laughed vigorously as she made the remarks. She claimed she became ill because she refused to sleep with her mother. She added that she was "quite old" and was married to a female who was "parading" as a male. The diagnosis was dementia præcox of the hebephrenic form.

The menstrual cycle began at 14 and occurred regularly every 30 days; the menses generally lasted about seven days and were accompanied by severe backache.

Biochemical studies were begun December 15, 1933 and ended February 9, 1934. Around January 8, 1934 she began to improve slightly in that she took some small interest in things about her; the improvement continued up to January 21, 1934; during this period (January 8—January 21) her general interests enlarged and she participated with apparent ease in many activities. She was communicative only to the extent of describing the activities in which she was engaged; she would say nothing at all about her personal problems. On January 21, 1934, she suddenly became restless, untidy, and showed no interest in her surroundings; on January 31 she became mute; her only

comment was to the effect that she had had "a bad dream" about her mother, father and "boy friend." She remained in the last mentioned condition until about the middle of March, 1934.

Hormonal excretions were positive on January 14, 15 and 16; from the psychiatric standpoint, on January 8 it was observed that she was taking more interest in her surroundings; the improvement continued slowly and without any distinct changes through January 14, 15 and 16 and steadily thereafter until January 21. Hormonal excretions were again observed on January 20, 21, and 22. On January 21 she became restless, uncooperative and almost mute; on January 23 she became pleasant, cooperative and cheerful when addressed by the nurse, although when left to herself she was seclusive and sparsely communicative. On January 27, 28, 29 the urine contained large quantities of hormones; during the three day period no special psychiatric changes were noticed, but on January 31 she became mute, inactive and indifferent to her personal needs and to the environment, attributing the change to a "bad" dream she had had on January 29. This condition continued essentially the same until about the middle of March, 1934.

CASE 9.—N. Rap., female, aged 16, single. From early girlhood the patient got along with great difficulty in her own home. Quarrels with the mother were incessant and antagonisms between the two became progressively worse as the patient grew into late girlhood and early womanhood. The outstanding difficulties comprised intense "spells" of anger, stealing, lying and truancy, actions that occurred not only in her home but also outside. She usually put a great deal of energy into her activities; she was often cheerful and good-natured; she was unable to apply herself consistently at any type of endeavor. For statistical purposes she was diagnosed as psychopathic personality without a psychosis. It was obvious from what she said that much of her psychopathology centered around the attitude of affection for her father and hatred of her mother.

The menstrual cycle began when she was eleven years old and appeared regularly during the first year, each menses lasting 8 or 9 days. After the first year they became irregular, occurring every 4 or 5 months, lasting about one day; the quantity was small. Generally during the menses she experienced abdominal pain and felt dizzy.

Biochemical observations were begun October 1, 1933, and terminated December 16, 1933. Hormonal excretions were positive on October 15 and 16; no special psychiatric changes were observed before, during or after the two days. Hormonal excretions were again positive on November 11, 12, 13 and 14; her general conduct improved on November 14 and continued better until November 20, when her conduct became worse. Hormonal excretions were positive again on December 12, 13 and 14; on December 8 her conduct began to improve and remained better until December 11. From December 11 to December 14 her conduct was worse. These shifts in conduct were also observed when there were no hormonal excretions.

CASE 10.—E. Pe., female, age 15, single. The patient is the fifth of seven children, there being three older brothers, an older sister and two younger sisters. The patient was brought up under very undesirable and unpleasant circumstances. When she was one year old her father became a psychiatric patient and subsequently spent the rest of his life in hospitals. The mother has always been "neurotic" and has been as a rule dull, incompetent and unreliable. It appears that she was as kind and as helpful as she could be, but her capacity for taking care of herself and her children was appreciably underdeveloped. The patient progressed steadily in her school work until the onset of her psychiatric difficulties.

It appears that psychotic symptoms occurred directly with the first menstrual period, when she was almost 13 years old. During the first menstrual period she remained almost completely immobile and was mute; she engaged only in such daily activities as dressing, undressing, eating and caring for usual body cleanliness and these acts she carried out only after constant urging. This type of behavior was said to have been very unusual for her. It began directly upon the first day of the menses and continued for eight days, that is, for two days beyond the cessation of the menses. On the ninth day she acted entirely as she had before the menses, so that no one would ever have suspected, according to the informants, that she had just experienced such pronounced changes. At each subsequent menstrual period—and they occurred regularly each month—until she entered the hospital it was said that the same symptoms occurred for approximately the same length of time.

Careful records taken in the hospital indicate that from October 1932 (the month of admission) until April, 1933, the menses appeared every two months and thereafter approximately every month, the usual duration for each period having been 6 days; sometimes it was 8, and sometimes 5 days. Under hospital observation it was noticed

that the same relationship of psychiatric and the menstrual symptoms did not occur. When the menstrual periods were appearing every two months, she showed alternating periods of overactivity and underactivity, but there seemed not to be any temporal relationship between the psychiatric changes and the obvious manifestations of the menses. During some menstrual periods she was highly disturbed, while during others she was immoderately subdued. Sometimes after the menses ceased she was overactive, sometimes she was underactive, sometimes her conduct and thoughts have been exemplary. During different periods she was under theelin treatment and later under antuitrin S. It is not known that either form of medication influenced her psychiatric syndrome.

The general psychiatric syndrome was that commonly observed in the hebephrenic form of dementia præcox, save that it appeared perhaps to have varied more frequently from overactivity to underactivity than is usual. But such variation is not uncommon among young patients in the early months or years of their illness.

Biochemical observations from the hormonal standpoint were carried out during the period extending from October 1, 1933 to December 16, 1933. Hormonal excretions were positive on October 18, 19, 20 and 21. On October 18 her conduct became much improved; the change was striking. Menses appeared on October 19 and continued until October 23. The improvement persisted until November 20, which was the third day of the menses for that month; on November 20 and for a considerable period thereafter her psychiatric condition was worse.

CASE 16.—J. Kr., male, age 64, married, three children. Before the onset of his psychiatric illness the patient was a steady, industrious and efficient worker in a responsible position, which he had held for 19 years. His interests were usually in his work, in which situation he was usually friendly and cordial. At home, however, he was stubborn and insistent upon having his own way; he was generally parsimonious. Sexually he had always been quite active, while his wife generally warded him off or submitted with thorough displeasure. At times he questioned her fidelity, though there appeared to be no foundation for that attitude. He expressed open hostility toward his son, who on occasions became fearful lest his father injure him. He was subject to outbursts of anger, while insisting that he was right in quarrels with his wife.

The onset of his psychiatric difficulties occurred when he was 63 years old. A short time before this he had lost his savings in the financial crash. Because it was observed that his efficiency at work was lessening, his employer suggested that he retire, which he did under duress. He promptly became depressed, restless, suffered from insomnia, anorexia, constipation and loss of weight. He lost interest in everything, save his clinical condition; self-accusations were predominant, although he was also suspicious of the motives of others. At about this time he showed a heightened interest in his older daughter and in his wife, but he was extremely antagonistic toward his son who was about to embark upon what seemed to be a successful career.

The preponderating symptomatology comprised an affective disorder beginning at the age of 63; the clinical diagnosis was involution melancholia.

Biochemical observations (hormonal) were started November 25, 1933, and ended April 27, 1934. Hormones were excreted on November 28; no psychiatric changes were observed before, during or after November 28. Hormones were excreted again on December 31 and January 1; on December 13, and 14 he appeared improved; from December 15 to December 20 he remained unimproved; from December 21 until January 9 his psychiatric condition was improved. Hormones were excreted again on February 18 and 19, again on February 28, March 1 and 2. During these last two periods of hormonal excretion the psychiatric condition showed no fluctuation as compared with the condition before and after the periods of excretion.

CASE 17.—S. Tu., male, age 49, married, no children. Before the onset of the psychiatric illness the patient was always extremely meticulous about everything that he did. He was extremely conscientious in his attitude toward work, play, social and marital duties. He was inordinately neat and clean and exercised himself beyond reason in the avoidance of uncleanliness. Whenever he touched anything he promptly scrubbed his hands. He was unduly devoted to his mother and throughout his married life he continued the same fondness and attention to her that he had shown before he was married. He was never able to have sexual intercourse with his wife, because, when penetration was about to take place, there was complete detumescence.

The patient had always been superlatively considerate of the feelings of others and went to great lengths in his efforts to be kind. The onset of his illness (when he was 47 years old) was associated with the exact opposite of kindness, for he voluntarily sought and gave evidence that resulted in the legal execution of those against whom he had given evidence. Following the death of the accused, the patient became agitated

and depressed, claiming that he had brought irreparable disgrace upon his family. There were many other symptoms referable particularly to the anus (he believed that he had three anal openings) and to dirt and germs; he believed an apparatus issued from his anus, going first to his heart and then to his phallus. The clinical diagnosis was involution melancholia.

Biochemical observations (hormonal) were begun February 11 and terminated April 27, 1934. Hormones were excreted on February 28 and March 1. There were no essential changes in his psychiatric condition before, during or after this two day period. Nor were there any psychiatric changes observed when hormones were excreted on March 8 and 9 and again on March 25 and 26.

CASE 18.—H. Go., male, age 21, single. Before the onset of his psychiatric illness the patient was a quiet, affable young man, whose interests were largely devoted to scholarship and to religion. He completed two years of college work, although he exhibited no special urge or interest in the work that he was doing; he was simply a student who carried out the work assigned to him. Throughout his childhood and early adolescence he showed an exaggerated disinterest in almost all spheres; he played very little; he developed no friendships; he had no hobbies, no favorite pursuits. Ordinarily he was reticent and was almost entirely passive in the matter of conversation.

Pubertal changes became obvious at about the age of 13. At that time the thyroid gland began to enlarge, he complained of feeling weak and his interests in general became more restricted. It is said that he had palpitation, easy fatigue, a feeling of "nervousness," a reversal of the sleep rythm, in that he was awake most of the night and slept the greater part of the day; the basal metabolic rate varied from plus 20 to plus 40. He was given roentgen ray treatment and is said to have shown some improvement while under it. However, the general lackadaisical, indifferent and inactive tendencies became more pronounced, until finally all interests were relinquished and he sought hospital treatment. For a relatively short period he developed some additional disorders; he allowed saliva to accumulate until the mouth cavity could hold no more; there were also some transitory compulsive phenomena, such as tapping an object before going to bed; he ate voraciously for a few hours and would go without food for the rest of the day. During the past few years, however, his general attitude has been more or less consistent, in that he has been decidedly quiet and inactive. The diagnosis is schizophrenia of the simple type.

Biochemical observations (hormonal) were made over the period extending from February 15 to April 27, 1934. The studies are being continued. During this period nothing unusual for him occurred in the emotional, ideational behavioristic or general physical sphere. There were several occasions when hormonal excretions were reported positive, but his general psychiatric condition did not change during those occasions. His condition was especially observed because he appeared to have been excreting hormones more or less periodically.

CASE 19.—S. We., male, age 15, single. The patient, a boy of borderline intellectual level (I. Q., 69), was referred to the hospital for two principal reasons, according to the parents; he was failing to make progress in school and he exhibited an increasing antagonism toward his mother and toward a younger brother, of whom he was jealous. From early childhood he had showed delayed and inadequate physical and mental development. His inadequacies were constantly called to his attention by his mother, as a result of which he felt decidedly inferior. He tried to circumvent some of them by desiring manual types of activity and by struggling against the mother's censuring attitude, but until he came under the supervision of the psychiatrist he was unsuccessful.

The patient was 61 inches high and weighed 110 pounds. The forehead was shortened; almond shaped eyes; the central incisors were large and spaced; large fat pads over the abdomen; feminine type of breasts; testes were undescended; bilateral hyperopia; superficial and deep reflexes increased. Roentgen ray plates of the lungs, heart and head revealed nothing unusual. The epiphyses of the long, short and flat bones had not yet fused. There was a spina-bifida of the first sacral segment. Blood Wassermann reaction was negative; the basal metabolic rate was minus 20 per cent.

Biochemical observations (hormonal) were begun November 26, 1933, and (for the present report) terminated April 23, 1934. Under antuitrin S (100 rat units daily) the testicles descended into the scrotum. His general behavior during this time has continued unaltered.

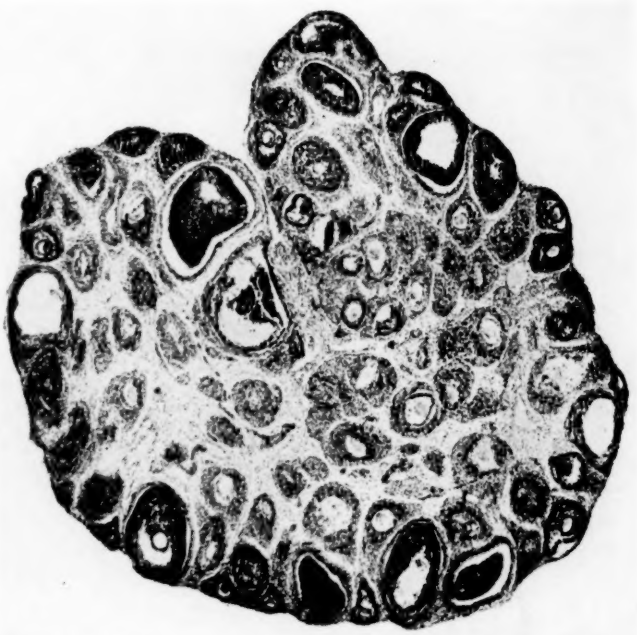

FIG. 1. *Immature Ovary.*—Rat 3399, age 24 days, total weight of ovaries 15 mg. The microphotograph shows beginning ripening of some graffian follicles with the majority undeveloped.

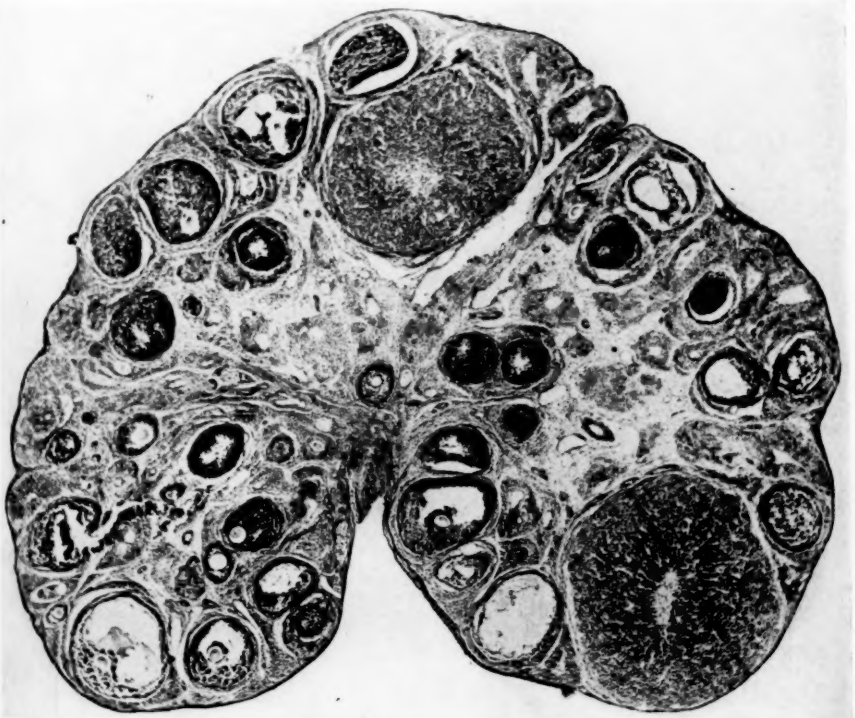

FIG. 2. *Mature Ovary.*—Rat 2520, age 36 days, total weight of ovaries 40 mg. The microphotograph shows two large corpora lutea and a small number of graffian follicles which are beginning to develop.

FIG. 3. *Luteinized Ovary.*—Effect of antuitrin-S injection. Rat 368, total weight of ovaries 25 mg. The microphotograph shows multiple corpora lutea with only slight increase in weight and size of the ovary.

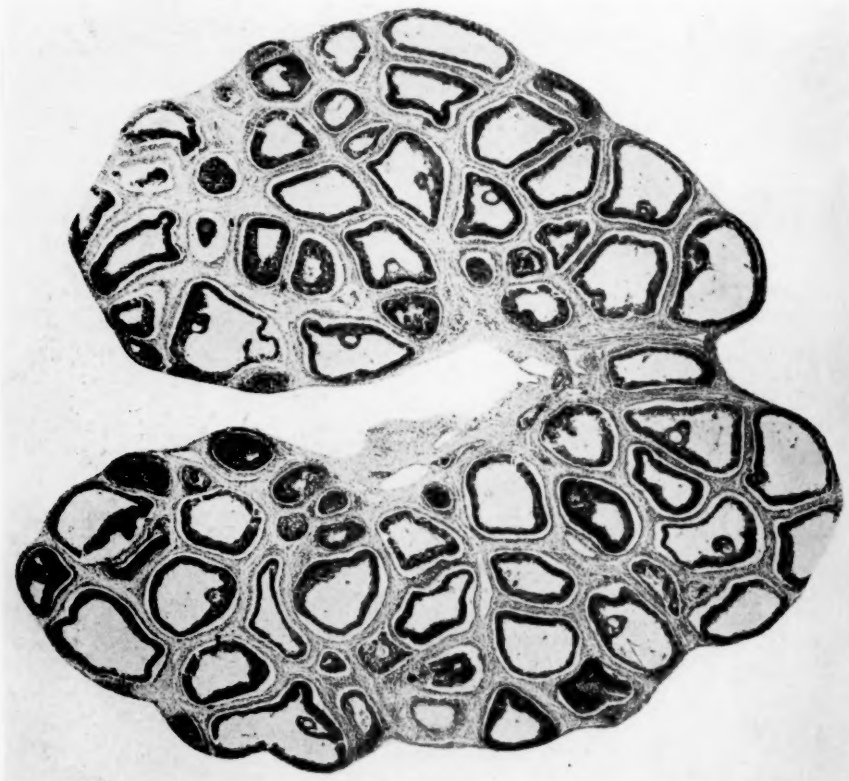

FIG. 4. *Follicular Stimulation of Ovary.*—Rat 25, age 25 days, total weight of ovaries 110 mg. The effect of the injection of the extract from a total 24 hour specimen of urine from Case 4 (April 26, 1934). The microphotograph shows diffuse follicular stimulation without luteinization and marked increase in size and weight of the ovary.

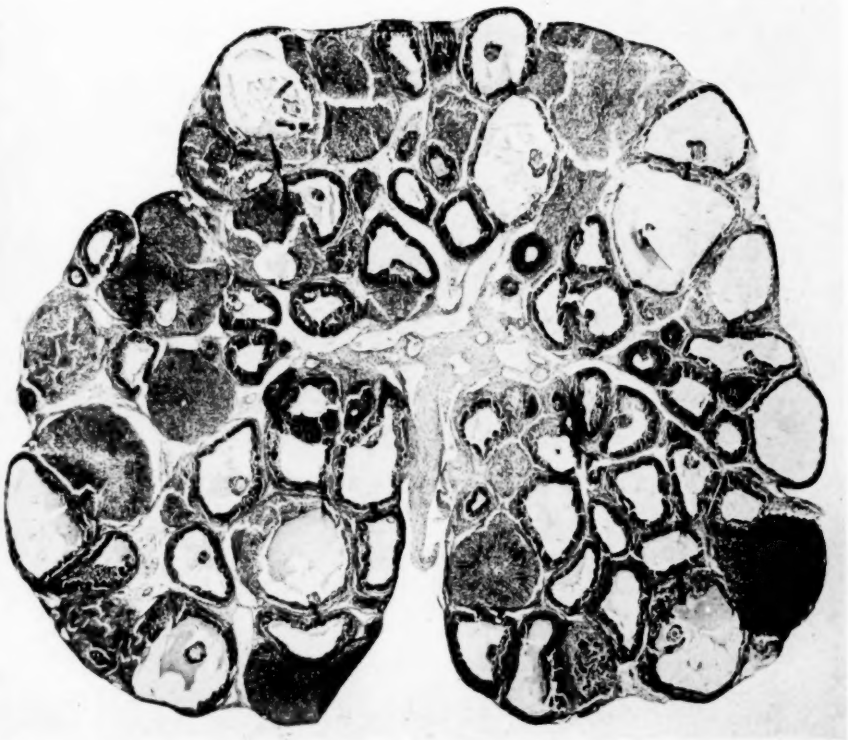

FIG. 5. *Follicular Stimulation and Luteinization of Ovary.*—Rat 2356, age 25 days, total weight of ovaries 120 mg. The effect of the injection of the extract from an approximately total 48 hour specimen of urine from Case 2 (Nov. 4-5, 1933). The microphotograph shows diffuse follicular stimulation, multiple corpora lutea and marked increase in weight and size of the ovary.

FIG. 6. *Moderate Follicular Stimulation of Ovary.*—Rat 3316, age 25 days, total weight of ovaries 31 mg. The effect of the injection of the extract from a total 48 hour specimen of urine from Case 18 ♂ (April 27-28, 1934). The microphotograph shows several stimulated follicles and perhaps beginning luteinization in some of them and moderate increase in size and weight of the ovary.

UNIV. OF MICH.

DISCUSSION.

DR. CLARENCE O. CHENEY (New York, N. Y.).—Mr. Chairman, I shall say only a few words to emphasize some of the points brought out by Dr. Harris. We do wish to call attention to the desirability, which this work evidences, of making very careful clinical psychiatric studies, at the same time with physiological and chemical studies on the same patients. We are fortunate in having that opportunity at the Psychiatric Institute, where the patients are under twenty-four hours' observation for an indefinite period, practically as long as we wish to have them and where the chemist and the internist and the clinical psychiatrist, all on the same staff, are working in close cooperation, not only physically but spiritually in the same building.

We wish also to call attention to the importance, as Dr. Harris has mentioned, of examinations of 24-hour specimens and not merely samples of urine which may lead to false conclusions, as he has indicated; and also of the examination of 24-hour specimens not only once or twice, but over a comparatively long period so that one may catch changes that may be developing from day to day or from week to week in an individual patient. We feel that reports that may have been made previously by other investigators on the presence or absence of this follicular stimulating hormone may not have been entirely true because of this lack of a careful, prolonged observational method.

We wish also to call attention to the fact that the evidence of this hormone is shown as yet only by the physiological method, that is, its effect on the ovary of the rat. Rats differ among themselves somewhat as human beings do. We have tried to get them as nearly similar as possible by carrying out careful breeding of continued unified strains so that we are not working with different strains or rats that are bought indiscriminately in the open market. We feel also that the results that may be reported by different investigators may be influenced by the fact that they are not using this careful standardization, as far as possible, of the animal that is being worked upon.

The physiological method has—we were going to say definite, we perhaps should say extensive limitations, because it is not a method that is the same as a test tube experiment, where one can measure by spectographic or other methods what the effects of a particular procedure are.

This work, as I take it, is simply a preliminary statement of observations that have been made over a comparatively brief period of time, although it is a matter of months, on a variety of psychiatric reactions. I think it is very definitely felt that we are not reporting a correlation of mental syndromes or mental reaction types with certain amounts of secretion or lack of secretion of the follicular-stimulating hormone. There are certain suggestions only that point this way. For example, if the normal woman secretes rather regularly somewhat definite amounts of this follicular-stimulating hormone and if patients who have broken down in their integration show a variability in themselves from week to week or an irregularity in that secretion, it is rather suggestive to me that that is another evidence of a

lack of stability or of good integration in the organism and that if the physical-chemical reactions in a person are irregular or unstable, it wouldn't be at all surprising that that person also had perhaps a poor psychic integration. I believe we might be more justified in believing that these two evidences of lack of integration are more a coincidence than cause and effect.

We expect to carry on these studies. It is purely a research problem, and like most research activities that we carry out, they are long and require unusual patience. Those of us who are more of the clinical-psychiatric turn of mind give credit, to those who have the patience and the persistence to work for months, sometimes for years, without perhaps much being shown in results, certainly often nothing dramatic. But it is the type of research that we feel will eventually bring us to the real truth.

Dr. Richard H. Hutchings (Utica, N. Y.).—I want to congratulate Dr. Harris and his associates in the undertaking and carrying on of this experimental work. Its value to one who calls himself a clinician and not a laboratory man lies in the relationship which exist between the functions of the endocrine system and the emotional life of the individual. As clinicians, we are very much occupied with the emotional life and here is a possible lead which will help us to a better understanding of that dim borderline, not perhaps so much a line as a field, between the somatic processes and the emotions. Of course, work has been done along that line already but not as yet, anything that is convincing, particularly bearing upon the core of the emotional life, that is, upon the sexual system and the hormones which to me seem to offer a fruitful field for investigation with this thought in mind.

I hope that Dr. Harris will continue this investigation and that means will be made available for it to be carried out, and that we will hear from him again when he has progressed further in his investigation and possibly ready with some conclusions, even though in another year they may yet be only tentative and preliminary.

Dr. Roy G. Hoskins (Boston, Mass.).—This work that has been opened up in the New York Psychiatric Institute has important bearings on the field of endocrinology in general. It is a way of attack that endocrinologists have dreamed of for years, a method of determining the performance of the hormone-secreting organs directly rather than by inference. In psychiatric patients direct methods of diagnosis are particularly needed because of the possible occurrence of metabolic aberrations seemingly but not actually due to glandular disorders.

The undertaking is difficult and the authors are to be congratulated that they have made such substantial progress.

Dr. Meyer M. Harris (New York, N. Y.).—I wish to thank the various members for the discussion of the paper.

In regard to the lack of integration of the organism, as indicated by the disturbance in the hormonal secretion, I think there may be something of

fundamental importance in this finding since we do not know as yet the rôle which the nervous system plays in the functions of the pituitary gland. It is quite possible that with disturbances in certain portions of the brain, one may see an effect on hormonal excretion, if there is a relationship to the function of the pituitary gland.

I also wish to say, as Dr. Cheney has indicated, that this is just the beginning of some of the work which has been planned and we have thus far only studied one of the hormones, or perhaps two, including the luteinizing hormone of pregnancy urine. It is our hope to extend the work to some of the other hormones which are obviously related to the problems under consideration.

PSYCHOSES OF MYXEDEMA.*

By LOUIS J. KARNOSH, M. D., and RICHARD E. STOUT, M. D.,
Cleveland, Ohio.

Since the classic report in 1888 of the committee on myxedema of the Clinical Society of London,[1] both the mental signs of hypothyroidism and the occasional occurrence of marked psychoses have engaged wide interest. The committee characterized myxedematous insanity as an acute or chronic mania, dementia or melancholia, with a marked predominance of suspicion and self-accusation. Thus, the non-specific nature of the reaction pattern produced in different patients by this physiologic depression has long been appreciated. Hayward and Woods [2] have recently discussed the pitfalls in differential diagnosis.

Less severe psychic effects of the same hormonic deficiency such as retarded perception, thought and action are a constant part of the symptomatology of myxedema which spares no tissue or system of the body. Drowsiness, apathy, forgetfulness, and irritability are also frequently seen.

These phenomena are considered by Crile [3] to be due to a decrease in the permeability of all the cells of the organism, leading to decreased nutrition, oxidation, and potential. Thommen [4] stresses faulty nutrition of the cells and the infiltration of various tissues with products of faulty catabolism. Means and Richardson [5] divide the reaction of the nervous system into a marked reduction in irritability and reactivity of (a) the central nervous system as shown, for example, in the diminished perception of sounds, impaired memory, and diminished reflexes, and (b) the autonomic nervous system as manifested in lessened secretory and involuntary motor function, such as peristalsis and cardiac action.

* Read at the nineteenth annual meeting of The American Psychiatric Association, New York City, May 28–June 1, 1934.

From the Department of Nervous Diseases, Western Reserve University and the Psychopathic Division of the Cleveland City Hospital.

If the physiologic function of the cells of the cerebral cortex and basal ganglia is sufficiently depressed to interfere with the perception of stimuli or the correct association and integration of ideas, or the correlation of thought processes with the affective tone of the individual, the distortion of personality thereby produced assumes the form of a psychosis.

Why is there this wide difference in the thought content and behavior of these patients? Why are not all subjects of myxedema affected in a similar manner? The degree of depression of the metabolic rate cannot be correlated with the occurrence or absence of psychotic manifestations, and forms no index of their severity. The mental disturbances frequently revert to normal at a rate much slower than the restoration of a normal metabolism, an observation previously made by Parker and Haines.[6] Ziegler [7] has observed that thyroid deficiency appears to have the effect of bringing into relief latent hereditary disposition and constitutional tendencies. These predisposing factors are as varied in myxedematous individuals as in the general psychopathic population and cause different persons to react dissimilarly to the same physiologic depression. The age of the subject seems to modify greatly the reaction pattern, as do involutional and arteriosclerotic changes.

Conflicting ideas have been advanced as to what, if any, alteration occurs in the function of the thyroid during the normal climacteric. Mazer and Goldstein [8] believe that it is usually accompanied by a decrease in thyroid activity, but state that a preexisting hyperthyroidism may become augmented, while a preexisting thyroid deficiency usually becomes more marked. Curschmann [9] and Deusch [10] have reported cases of myxedema accompanied by mental changes, which followed very closely a surgical menopause. Spontaneous myxedema, though it may occur at any age, is very common in the involutional period of life, and in this critical period seems to be most prone to upset the affective equilibrium of the individual.

Myxedema developing late in life in individuals with general and cerebral arteriosclerotic changes is also prone to produce mental symptoms. These usually simulate an organic dementia with loosely woven paranoid delusions.

The feeble cardiac action of myxedema when operating against the vascular degenerative changes of arteriosclerosis may not pro-

vide an adequate cerebral circulation. An organic psychosis is produced in which adequate treatment holds forth great hope of recovery.

Young individuals with myxedema, particularly if the prepsychotic personality is tainted with an excess of schizoid components, are prone to develop dissociation with active hallucinosis and withdrawal from reality into a rich fantasy life. Changes of a schizophrenic nature require more than a hormonic deficiency for their production, and once well-established, may not be reversible even with adequate thyroid treatment. The rôle of deficiency of thyroxin as a precipitating cause is not to be minimized even though the mental changes persist after the deficiency is removed. Like all other psychoses which assume a schizophrenic reaction pattern, be they puerperal, toxic, syphilitic, associated with pernicious anemia or due to other cause, the prognosis is gravely altered.

The following cases are reported to emphasize some of the factors which may modify or determine the reaction pattern and course of psychoses associated with myxedema.

CASE 1.—An Italian woman, 43 years of age, was admitted to the Cleveland City Hospital August 1, 1931, apparently in circulatory collapse. She attended school for four years in Italy, and has lived in the United States for 30 years. She was a jolly, energetic, good natured, very active woman and a good housekeeper. She first expressed ideas of persecution in 1926, accusing her relatives and friends of trying to poison her. She slept a large part of the day, and was restless at night. She became unable to attend to household duties. In 1928 she complained of nervousness and of hearing voices. In 1929 she was more depressed and confused. She felt that no one liked her and that everyone was trying to harm her. She wandered away from home on aimless walks, and refused to eat on many occasions. While under hospital observation she was very depressed and seclusive, remained in her room all day, hallucinated and mumbling to herself, slow to understand questions, and taking no interest in her surroundings. Her appetite was poor, and she was drowsy most of the time. Both receptive and kinetic activity were greatly retarded.

The woman was somewhat obese with a very pale color and coarse facial patterns featured by a thick, dry, scaly skin, edema of the upper and lower eyelids, and very narrow palpebral slits. Her hair was scant, coarse, dry, and lacking in oil. The thyroid gland was not palpable. The heart borders were within normal limits. Sounds were faintly audible, but regular. The pulse was easily compressible. The rate was 64 per minute. Blood pressure was 90 systolic and 60 diastolic. There was a mild ichthyosis of the skin of the extremities, and a non-pitting edema of the lowers. There was a

suggestive cortical weakness of the left facial nerve. Tendon reflexes were markedly diminished in the upper extremities and could not be obtained in the lowers. Superficial reflexes were retained. There was weak plantar flexion. There was an anemia of 3.1 million with a color index of 1.3, but with nucleated red cells. The basal metabolic rate was minus 28 per cent.

A few days after the onset of administration of desiccated thyroid she became more alert, interested in her surroundings, and her appetite was improved; but at the same time she became more irritable, and thought that she was being poisoned with the thyroid extract. The skin and hair improved in texture, and the edema of the eyelids disappeared, but the myxomatous infiltration of her ankles persisted for several months. Her anemia improved and her weight was decreased by seven pounds. One month later she was able to take excellent care of her home and family and expressed no paranoid delusions, but was still apathetic and listless when not occupied and retained some retardation of perception.

Eight months after the administration of thyroid extract she discontinued its use; and within 30 days became very paranoid, hallucinated, delusional and irritable, refusing to eat. She was again hospitalized for two and one-half months and responded equally well to the administration of desiccated thyroid gland. Since February, 1933, seven months after her relapse, she has been free from all of her delusional ideas, cheerful, active, efficient in her housework, and her perception and reasoning ability showed no impairment. Her relatives and friends can detect no deviation from her normal personality.

Résumé.—A woman of syntonic temperament and poor educational qualifications, approaching the involution, developed a psychosis characterized by a retarded and depressed affectivity, poorly systematized ideas of persecution directed against her family and neighbors, and vague hallucinatory experiences accompanied by the physical and metabolic signs of myxedema. Improvement in the psychotic manifestations following the administration of desiccated thyroid was striking but incomplete. An apparent residue of intellectual and emotional deterioration remained. A relapse of her mental and physical symptoms promptly followed the halting of glandular treatment; the mental recovery following the resumption of treatment exceeded the original improvement.

CASE 2.—A white married woman, 58 years of age, was admitted on April 15, 1932, because of a mild depression with paranoid ideas, hallucinations and delusions. She was sensitive and reserved, but quite sociable and had many friends. She did not use alcoholic beverages. She had been married for 35 years, and her married life was entirely compatible. She was not irritable, suspicious or quarrelsome. She had had a hysterectomy and bilateral oophorectomy in 1904.

Three and one-half years previously she became nervous, slept poorly, and began to talk constantly, mumbling to herself a greater part of the time. A vivid delusional state developed. She was convinced that the other tenants in her apartment house were installing special telephones for the purpose of overhearing her conversation. She thought that the neighbors were going to arrest her and her husband. She was actively halluci-

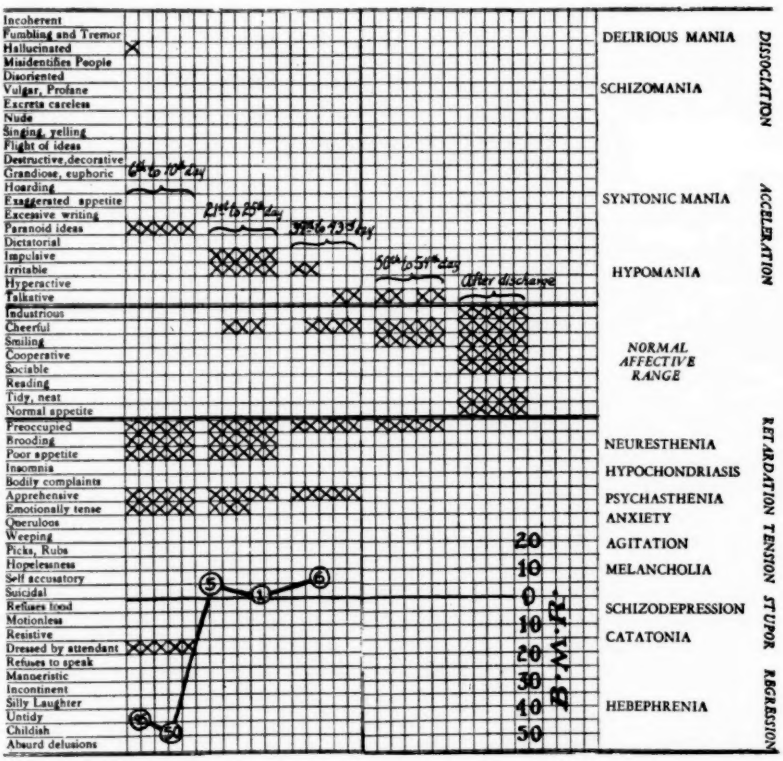

FIG. 1.—Case 2. Showing the correlation between mental symptoms and basal metabolism rate on a modified Johns Hopkins behavior sheet.

nated, on one occasion asking her husband to complain to the landlord of the noise which the neighbors upstairs were making, when in reality there was no noise. She was convinced that her son had killed his wife and was now about to kill his father. She was seclusive, apprehensive, moderately depressed without agitation, and severely retarded. She had been unable to walk at all for nine months. She complained of being cold at all times and of pain in her left leg.

The patient was very weak, unable to stand without assistance, and appeared very anemic, with a cold, lemon-colored skin. Her hair was sparse. Edema of the upper and lower eyelids was very prominent. Ophthalmoscopic examination revealed mild sclerotic changes. The tongue seemed large for the mouth, was red and beefy in appearance, and exhibited a coarse tremor. Speech was slow and monotonous. The thyroid was not palpable. The heart was enlarged to the left, but the apex beat was not visible or palpable. Sounds were regular. There was a systolic murmur at the apex. Blood vessels were palpable and the blood pressure was 190 systolic and 110 diastolic. The skin of the extremities was dry, scaly and atrophic with a lemon-colored tint. Tendon reflexes were delayed and sometimes a double response was elicited. Achilles reflexes were diminished and the plantar responses were indefinite. There was a hyperesthesia to pinprick and brush over feet, ankles, and lower legs. There was a definite pain on pressure along the course of the external popliteal nerve trunks, more pronounced on the left.

Roentgen examination of the chest showed a marked enlargement of the heart shadow, the transverse diameter of which was 16.8 cm.; 7 cm. to the right of the mid-line and 9.8 cm. to the left. The aorta was also slightly enlarged. The electrocardiogram showed changes typical of the myxedema heart. The urine contained a slight amount of albumin, and an occasional cast. There was an anemia of 3.2 million, with a color index of 0.9. The basal metabolic rate was minus 49 per cent.

After two and one-half weeks of treatment the electrocardiographic changes reverted to normal, and after five weeks the transverse diameter of the heart shadow was reduced by 6.1 cm. The blood pressure was now 130 systolic, and 80 diastolic. The urine was normal, the edema of her eyelids had almost completely disappeared, and her anemia was improved.

She became free from all delusional ideas and hallucinations. During the course of her endocrine readjustment she became quite irritable, but this was only a temporary manifestation. She became cheerful, optimistic, congenial and industrious. Her polyneuritic symptoms improved and she was able to walk without assistance after a period of over two years. She has been free from mental symptoms for two years and does light housework.

Résumé.—A 58-year-old woman with evidence of arteriosclerotic changes of moderate severity, who had always been reserved and sensitive, when subjected to the metabolic sluggishness of a profound myxedema became confused, affectively retarded, and depressed. Her thinking was distorted by vague hallucinatory experiences, and the threshold to paranoid adjustment was transcended.

The enlargement of the heart was probably due to the lack of hormonic stimulation of the autonomic nervous system, resulting in a reduction in cardiac activity and a flabby heart musculature operating against an increased peripheral resistance. Ayman,

Rosenblum, and Falcon-Lesses [11] have recently analyzed 22 cases of the "myxedema heart" collected from the literature since Zondek first described the condition in 1918, and added two original cases. They consider enlargement of the heart and its return to normal after adequate treatment with thyroid extract the most important diagnostic feature of this disorder. The reduction of the transverse diameter of the heart shadow varied from 1.0 cm. to 6.3 cm. The decrease in this case of 6.1 cm., after five weeks of treatment, approximated the maximum reported. The polyneuritic sensory manifestations and the delayed and reduplicated tendon reflexes bear witness to the myxedematous involvement of the nerves and muscles.

The psychotic manifestations were similar to those occasionally seen in patients with senile depression, primary and secondary anemia, or cardiac decompensation, all of which may lead to impairment of the cerebral circulation and therefore to reduced nutrition and oxidation of the brain cells and the accumulation of toxic catabolic substances.

CASE 3.—A 35-year-old single woman was admitted on May 3, 1932, because of a vivid hallucinosis. She had always been seclusive. She did not associate freely even with members of her own family, but preferred to stay in her room and read. She was a dull student, but managed to complete eight grades of school at the age of 15. She then entered a convent and remained one year. Since that time she has remained at home, has never cared to mingle with other people, and has never held a job. She seldom went to dances or parties, and never became heterosexualized. Her entire interest became absorbed in her voice, in which she considered she had some talent. She had always been regarded as queer, and for several years as a possible candidate for a detention hospital.

Although she had apparently suffered from transitory hallucinatory periods for an indefinite period, she was not upset by these experiences until February, 1932. At that time she began to sleep poorly. She would stay up most of the night, walking around the room, moving her bed and complaining that there were snakes and spirits in her room. She also saw many dead people in her room, some of whom were placing poison on the soles of her feet. Later she began to chase snakes, rod in hand. She also saw alligators, tigers, and rats. She was tormented by a spirit named Joyce Kilmer and heard her family crying out incessantly for this spirit to cease its work of destruction upon her. As time passed she began to fantasize more and more vividly. The then governor, Franklin D. Roosevelt, was her ardent admirer and visited her room at night. She wrote him numerous

love letters thanking him for his visits, and for his letters and flowers, which were always withheld from her by her parents.

The patient was a very obese woman, weighing 194 pounds. Her scalp was covered with thick, coarse hair devoid of oil. There was a slight puffiness of the eyelids. The thyroid gland was not palpable. Heart size was normal. Sounds were regular. No murmurs were heard. The blood pressure was 105 systolic and 70 diastolic. The extremities were very obese and there was no pitting edema. The urine contained a trace of albumin, but was otherwise negative. The basal metabolic rate was minus 28 per cent.

Sufficient thyroid extract was given to restore the metabolic rate to normal and to elevate the pulse rate from 80 to 100, but with no beneficial effect upon her psychotic manifestations. The active hallucinosis and dissociation accompanied or propelled by an unbounded euphoria continued unabated. She constantly heard the voice of "Lord Ashfield" who was in London but in daily radio communication with her. During an observation period of 11 months the content of her hallucinosis changed from time to time, but the vividness of her dissociation was never affected.

Résumé.—A 35-year-old, extremely schizoid, single woman, with poor intellectual and affective qualifications for making a social adjustment, under the added handicap of insufficient thyroxin, underwent a complete introversion and affective distortion. The severe dissociation was ushered in by bizarre visual hallucinations vividly portrayed, such as were noted by Beck [12] in 26 per cent of 194 consecutive cases of hypothyroidism. The physical manifestations of hypothyroidism were relieved by adequate treatment, but no mental improvement occurred.

Case 4.—A 13-year-old Jewish school girl who had been sensitive and reserved, but a good student, at the age of 11 developed typical symptoms and signs of exophthalmic goiter. The basal metabolic rate was plus 66 per cent. Ligation of the left and right thyroid arteries was followed by some improvement, but the basal metabolic rate remained at plus 31 per cent and the pulse rate at 150 per minute. A thyroidectomy was performed on May 12, 1933, and was followed by rapid amelioration of all symptoms.

One month later she began to manifest a peculiar depressive psychosis. She was very calm and free from emotional tension, but seemed reticent, quiet, and introspective. She desired to be alone. She was distrustful of her friends and suspicious of her associates. She had had no visual or auditory hallucinations.

She was at this time well-nourished, having gained 22 pounds since her operation. Her exophthalmos was less marked, and her heart sounds regular. Her pulse rate was 86 per minute. She had slight difficulty in walking because of weakness of her lower extremities. Her ankles were a little swollen. The basal metabolic rate was now minus 30 per cent. Thyroid extract was ordered in dosage of one and one-half grains a day.

She gradually developed ideas of persecution. People were talking about her, were going to kidnap her, were putting poison in her food. She refused to take thyroid extract because she thought it was poison. She slept poorly, refused to eat and ran about her home attempting to escape, with all the quick, furtive movements of a caged wild animal. She had not menstruated since June. Six months later these reactions persisted and it was impossible to examine her, or to do metabolic studies, but she was placed on thyroid extract in doses of 2/5 grains a day. The following month she was quieter, slept well, and did a little housework. She was less furtive and active in her movements. Prolan in dosage of 50 rat units was administered twice a week. She continued to improve throughout January, 1934, and had a scant menstrual flow, terminating an amenorrhea of seven months' duration.

Résumé.—A young Jewish girl just entering the menarche developed a rabid hyperthyroidism. The symptoms were not atypical, but very prominent, and only after three operations was relief obtained. Within one month the basal metabolic rate was depressed from plus 30 to minus 30 per cent and the signs of myxedema were apparent. The interrelationship of the endocrine glands was violently disturbed during a very critical period. Menses ceased. The girl became seclusive, apathetic, incoherent in speech and depressed. For a short period she was very irrational, and she gradually became distrustful and paranoid. Under treatment with desiccated thyroid she became more erratic mentally, extremely psychasthenic and negativistic. When the dosage of the drug was reduced and prolan was given, gradual improvement ensued and menstruation reappeared seven months after thyroidectomy.

Conclusions.

1. The psychoses occurring in persons with myxedema are due to well recognized physiologic disturbances which affect all the tissues of the body.

2. The wide variation in the form of the psychoses is attributed to differences in hereditary, constitutional, and environmental background of individuals with myxedema. These differences are as great and as important in subjects of psychoses associated with hypothyroidism as in the general psychopathic population.

3. Myxedema occurs frequently at the climacteric and at this time is particularly prone to upset the affective equilibrium of the individual.

4. In elderly patients with general and cerebral arteriosclerosis, myxedema leads to a further reduction of the cerebral circulation and, therefore, to the production of an organic psychosis characterized by confusion, loss of memory, vague hallucinatory experiences and a loosely constructed paranoid delusional system, accompanied by mild depression and retardation. The administration of desiccated thyroid gland may lead to striking relief of all symptoms.

5. Young individuals with myxedema especially those with an excessively schizoid personality are prone to develop a vivid dissociation and hebephrenic regression. If well developed, these changes may not be reversible, even with adequate treatment.

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DISCUSSION.

Dr. Albert G. Odell (Clifton Springs, N. Y.).—One would generally suppose that retarded mental activity would go more or less with lowered metabolism, which usually though not always produces a myxedema. I have

been interested for some time in the metabolic rate that is found in patients coming for treatment of the so-called borderline conditions. Many of these fall within the retarded group. When I say retarded, I am not speaking alone of mental retardation, but also of retarded physical function. I felt that there should be among patients of this type a large number with a lowered metabolic rate, especially those with mild depressions and mild psychasthenias which have not become severe enough to demand hospitalization.

The metabolism has been studied in the 150-160 psychoneurotics which came under my personal supervision during the past year. Out of this number, 21 were in the menopause and of these, 14 were in the range from a minus 15 to a plus 10, and only 6 fell below the minus 15. There were 39 in whom fatigue was the outstanding symptom, and of these, some 31 were in the same range. In the depressive psychasthenic and anxiety group there were 31 out of 39 who fell within the same range. All of those having a manic-depressive trend were in the range from minus 10 to plus 10 or normal range. Of the hysterias, only one fell below minus 15. There were 48 in the miscellaneous group and of these, 33 were within the normal range.

It was quite surprising to see so many with a metabolism within the limits of normal. A study of these readings seems to indicate that there is no distinct relation between the type of neurosis and the metabolism, nor do those with a lowered reading (below minus 15) show a distinct trend in any especial direction.

I was hoping we might find something that would connect a lowered metabolism with the type and severity of the mental state, but our experience with these patients has been the same as that of Drs. Karnosh and Stout. We can therefore relieve some of the fear that is raised in the minds of these people by the fact that the thyroid output is low. The presence of myxedema does not mean a bad prognosis. They emphasize the fact that myxedema—and may I add, any case with a low metabolism yet without a definite myxedema syndrome—may bring out more sharply the general trend of the mental make-up of the individual, and in this I am in hearty accord.

I agree with them in the use of the thyroxin and thyroid or anything that will help the bodily mechanism to adjust itself to a more normal level. Thyroid medication will not change, so far as my experience has been, the emotion pattern of the individual, nor will it change, of course, the strains and stresses to which life subjects them.

I shall continue the use of the metabolism test and shall use thyroid in the proper cases, but without hoping for too much in the line of improvement except it be the general physical condition of the patient.

DR. LLOYD H. ZIEGLER (Albany, N. Y.).—Mr. Chairman, the paper of Dr. Karnosh is very interesting. Several years ago it was my privilege to study some patients with myxedema. His conclusions are essentially the same as those which I drew in my contact with such patients. It should be borne in mind that myxedema is not synonymous with low basal metabolic rate, that myxedema is a peculiar syndrome in which the edema is different

from that of heart disease or nephritis. According to some studies made in Boston a few years ago, such patients show a high protein or globulin content in the spinal fluid, and it seems likely that the substance producing the peculiar edema which may be present in the extremities and the face has gotten into the nervous system and may be causing the patients to react psychotically. The myxedema may bring out a latent psychosis. From a therapeutic standpoint, recovery from myxedema does not eradicate the constitutional tendencies to a latent psychosis. However, in case myxedema does unfold a latent psychosis, recovery from myxedema by sufficient doses of dessicated thyroid may not only bring about the recovery of the myxedema but may cause the constitutional psychotic tendencies to become latent again.

THE THERAPEUTIC EFFECTS OF ESTROGENIC HORMONE PREPARATIONS IN CERTAIN CASES OF IDIOPATHIC EPILEPSY AND IN MIGRAINE.*

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Evidence is rapidly accumulating both here and abroad which strongly suggests that certain cases of migraine are due to a disturbance of the glands of internal secretion, more particularly the hypophysis.[1, 2, 3]

Timme [1] believes that certain endocrine disturbances give rise to compensatory enlargement of the hypophysis, which in turn gives rise to headache by distention of the sella and to visual disturbances on account of the proximity to the optic chiasm and the optic nerves. Thomson [2] recently reported sella changes in 17 of 25 cases of "menstrual migraine" and he has observed therapeutic successes with theelin injections given for a week before the expected period. Similar satisfactory results with the placental hormone (emmenin) have been reported by Blakie and Hossack.[3]

The recent studies of Riley, Brickner, and Kurzrok,[4] in which they estimated the amount of prolan and theelin in the urine of migraine patients (11 females and 2 males), appear to point more directly to a disturbance of the endocrine balance in these cases. They found that the amount of theelin excreted was generally below the normal level but without relation to attacks. On the other hand, pituitary sex stimulating hormones generally appeared in the urine a few days before an attack and disappeared at or soon after the onset. They also appeared regularly in the urine in one of the males

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and irregularly in the other. Two patients with "status hemicranius" showed almost continuous excretion of pituitary sex stimulating hormones. Migraine attacks were induced in seven of nine female patients in from 4 to 12 hours after the injection of 2 cc. of a pituitary-like preparation (follutein). The successful therapy of certain cases by the Canadian and British authors with theelin and emmenin is explicable by the known fact that the presence of these hormones in the blood inhibits the formation of pituitary sex stimulating autacoids by the gland, whereas their deficiency leads to an increased formation in the hypophysis.[5]

The clinical literature contains numerous references which suggest a possible endocrine imbalance in certain cases of idiopathic epilepsy, the hereditary relationship of which to migraine has long been known. Twenty-five years ago, Gordon [6] reported 23 cases in whom the attacks coincided with the menstrual periods. In some cases the beginning of the epilepsy coincides with the appearance of the first menses. It is further suggestive that in 50 per cent of cases the onset of seizures occurs between the 10th and 20th years.[7] Phillips [8] calls attention to the relative frequency of convulsions at the menopause in women subject to migraine from youth. Schaefer and Brosius [9] reported a case of epilepsy arising at the menopause which was relieved by theelin injections. Gies [10] treated 25 female epileptics by daily injections of 100 mouse units of an ovarian preparation. He reported no notable or definite influence on the attacks.

On account of the apparent association of epileptic phenomena with the menses in certain cases, we considered it highly probable that these cases might respond favorably to sex hormone therapy, especially in view of the fact that there is frequently an associated disorder of menstruation. Since emmenin had been exhibited successfully in the treatment of migraine [3] and had been used with good results by one of the authors in several cases of this latter malady, we thought it not without interest to determine its therapeutic value in selected cases of idiopathic epilepsy.

Material.

Emmenin is the name applied by J. B. Collip,[11] Professor of Biochemistry of McGill University, to a hormone he has isolated from human placentas. It is obtained by extraction of the placenta tissue

with acid acetone. The acetone is removed under reduced pressure and ten volumes of ethyl alcohol are added. The hormone is soluble in alcohol and can be obtained in water soluble form by removal of the alcohol by distillation under reduced pressure.

Emmenin has been shown to be closely related chemically to the œstrogenic substance obtained by Doisy and co-workers and by Butenandt from pregnancy urine. This substance has been designated by a variety of names (theelin, amniotin, œstrogen, œstrin, menformon, etc.). Theelin has the empirical formula $C_{18}H_{22}O_2$, and is known chemically as keto-hydroxy-œstrin. Emmenin is closely related to it, having the empirical formula $C_{18}H_{24}O_3$ and it has been given the chemical designation tri-hydroxy-œstrin. It is now considered to be identical with theelol. Theelol is the term introduced by Doisy.

A few patients were given theelol (Parke Davis and Co.) and a few others were given amniotin (E. R. Squibb and Co.)* The emmenin used in this investigation was prepared in the Department of Physiology and Pharmacology of the University of Colorado School of Medicine.

Methods of Administration.

The usual dosage of emmenin employed was 15 drops given three times a day, orally administered. The medication was furnished in a special dropper-stopper bottle and the patient was advised to keep it in an ice box or a cool place. They were told that they could take the medication in milk, orange juice, or some similar liquid to cover the taste. Dosages as high as 60 drops were tried in some cases with no apparent difference in effect. Some of the patients were carried on a dosage of 10 drops twice daily. Amniotin was given subcutaneously usually one to two cubic centimeters three times a week for the week preceding and the week following menstruation. Theelin was given in a similar manner. Theelol was given orally, one capsule twice daily for five days starting two days prior to the expected menstrual period. Some of the cases in this series were allowed to take small doses of phenobarbital in addition to the hormone therapy. In all of the cases this dosage was much smaller than they had been taking

* We are indebted to Dr. John Anderson for a liberal supply of amniotin.

TABLE I.

Cases of Epilepsy Treated with Female Sex Hormone Preparations.

Case.	Sex.	Age.	Type of epileptic phenomena.†	Age at onset.	Duration of treatment.*	Degree of relief. Marked.	Partial.	None.	Remarks.
4777	F	19	G & P	11	E—7 mos.		×		
6741	F	43	G	13	E—2 mos.	×			Ovarectomized in childhood. Also has migraine.
E L	F	23	G & P	17	E—2 mos.			×	Seizures increased.
5903	F	16	G & P	1½	E—6 mos.	×			Marked gain in weight. Mental condition improved.
5560	F	14	G & P	7	E—2 mos.	×			Previous treatment varied and extensive but not satisfactory.
6308	F	35	P	19	E, A, T—7 mos.				Marked psychoneurotic element precludes interpreting results.
6537	F	17	G & P	13	E, A, T—9 mos.		×		Relief temporary. Treatment scattered spells.
5103	F	39	G	27	E—9 mos.	×			First seizure began during pregnancy.
5678	M	30	G & P	8	E—1 mo.			×	Increased length of petit mal attacks.
6643	F	19	G	17	E—9 mos.	×			Medication made menses regular. Dysmenorrhea has disappeared.
909	F	49	G & P	47	E—7 mos.	×			
6112	F	13	G	10	Th—2 mos.	×			
5679	M	19	G	16	E—8 mos.		×		Feeling of "well being."
3166	M	20	G & P	13	E—8 mos.		×		Formerly had marked periodicity of grand mal attacks (every 28 days).
6599	F	16	G & P	14	E—21 mos.	×			Marked feeling of "well being."
B. P.	F	15	P	13	E—8 mos.		×		
G. D.	F	31½	G	?	E—1½ mos.			×	
G	M	32	G & P	10	E—2 mos.		×		Grand mal attacks disappeared. Petit mal attacks are increased in length and severity.

* E—Emmenin.
A—Amniotin.
T—Theelin.
Th—Theelol.

† G—Grand mal.
P—Petit mal.

previously. They had all continued to have seizures while they were taking phenobarbital before the hormone therapy was instituted.

The results obtained in the series of 18 cases of epilepsy, 14 females and 4 males, are tabulated in Table I.

This series was selected from a larger group of epileptic cases in the Colorado Psychopathic Hospital and from the private practices of several cooperating physicians. We hereby give credit and thanks to Dr. Bradford Murphey, Dr. T. R. Knowles, and Dr. Emory J. Brady for their cooperation in this investigation. Most of these patients have been followed for several years at the Colorado Psychopathic Hospital. Complete case records are available, with encephalographic findings and blood chemistry studies. Many of them have been under hospital observation and trial periods with different types of medication have been instituted. It is thought, therefore, that the diagnosis of true idiopathic epilepsy has been definitely established in these cases. The cases in this series were selected because of a correlation in the appearance of the epileptic phenomena and the menses; the male patients were selected on the basis of a definite periodicity of the seizures. We wish to emphasize that the epileptic cases were not taken at random.

Results.

Epilepsy.

The pertinent data relevant to the individual cases are summarized in the accompanying table (Table I). The results in 14 female cases, ranging in age from 13 to 49 years, and in 4 male patients, ranging in age from 19 to 30 years, are included. Marked relief followed hormone therapy occurred in eight of the cases, all females. Partial amelioration of the symptoms was obtained in five others, three of whom were males. One male and two female patients failed to respond. The results were quite unsatisfactory in two patients. In one the seizures were increased in number and in another the duration of the petit mal attacks was increased. Two other cases were not included in the above summary statement. Case No. 6537 received partial temporary relief at the beginning of emmenin therapy, but later the extract not only failed to decrease the number of seizures but seemed to scatter them throughout the month. Case No. 6308 presented a marked psychoneurotic element

P—Petit mal.
A—Amniotin.
T—Theelin.
Th—Theelol.

which prevented a satisfactory interpretation of the results. However, for several months she reported marked improvement under emmenin therapy.

The most satisfactory results have been obtained in treating adolescent girls. The following two case reports are given to illustrate this point:

CASE No. 6599.—A 16-year-old, white female first entered the out-patient department, September 3, 1932. She gave a typical history of organic seizures. She entered the hospital for a period of observation and an encephalogram. The report on the latter showed that there was a marked widening of the cortical pathways over the right hemisphere and a suspicion of some cortical atrophy over vertex.

The patient's spells had their onset about the time of the onset of menstruation which occurred in July, 1932.

She was placed on emmenin, 15 drops, three times a day, and has continued on this medication fairly regularly since September, 1932. To date she has had four seizures. Two of these occurred when she discontinued the emmenin, because she was feeling so well. The other two spells occurred in February and March, 1934, in association with her menstrual periods. Since then, she has been placed on theelol, one capsule twice a day, for 10 days, starting two days before the expected onset of menstruation. She has reported that the emmenin gave her a marked sense of well being, that her menstrual periods were more regular and less painful than before emmenin medication was instituted. She has been able to go to school and has made satisfactory grades. She has not had any luminal since the emmenin therapy was instituted.

CASE No. 6643.—19-year-old female. The patient's first seizures occurred in October, 1932. These were typical grand mal attacks, in which she was unconscious for about 30 minutes and slept for several hours afterwards.

She was previously treated with thyroid and luminal.

Menophania at age 12. A short time before the patient's seizures began the periods became quite irregular and appeared every two weeks. The periods lasted about a week and they were accompanied by considerable dysmenorrhea. She was placed on emmenin therapy in August, 1933. Her menstrual periods became regular, the dysmenorrhea disappeared, and there was an absence of seizures.

She was working as a maid in a doctor's home when she had a very definite organic seizure last month. The doctor observed the patient in this spell and from his description there is no doubt but that the patient had a typical organic seizure. She had discontinued all medication one month previous to the attack because she "felt so well."

The patient has not had any luminal since the emmenin therapy was instituted.

One male case reported marked improvement:

CASE No. 5679.—19-year-old, white, single male. The patient first began having seizures in January, 1931. He usually has several grand mal seizures about every three weeks. He had been treated with luminal and diuretin. The patient was observed in the hospital and complete encephalographic, biochemical, and physical studies were made.

He was placed on emmenin therapy, 15 drops three times a day, in September, 1933, and was told to continue on his luminal. He has tried going without luminal and without the emmenin but feels that he gets along very much better and has fewer seizures if he uses both of these medications. He is working at the present time, making part of his living expenses. He is being tried on emmenin without luminal at the present time.

Among some of the interesting results noted was a marked increase in urinary output; an increase in weight occurred in some cases; others reported that there was a definitely increased "feeling of well-being." A number of the female patients who had had irregular periods and had suffered from dysmenorrhea, reported considerable relief following the institution of emmenin therapy.

While, of course, no conclusions can be drawn from one case, it is of interest to note here that one case of narcolepsy was treated with emmenin. The case treated was a 15-year-old girl who has been under observation in our clinic for several years and who has been tried on several types of medication. She was placed on emmenin therapy last fall for several months. The family stated, "This has helped her more than anything else that we have used." During some of the winter months she discontinued the emmenin. Last month she returned to the clinic to obtain some more emmenin because she was "beginning to have the sleeping spells again."

MIGRAINE.

In confirmation of N. H. Balkie and J. C. Hassock,[3] we have found emmenin to be effective frequently in giving relief in migraine attacks, especially in those associated with menstruation. Twelve cases of migraine (11 females and 1 male) were treated with emmenin. The pertinent data on these cases are tabulated in Table II.

Relief following emmenin therapy was marked in six cases, partial in three others, all female.

Of the 11 female cases, all but two showed a definite relationship of the attacks to the menses. It is, perhaps, of some significance to

TABLE II.

Migraine Cases Treated with Emmenin.

Case.	Sex.	Age.	Age at onset.	Attacks with menses?	Duration of treatment.	Degree of relief.			Remarks.
						Marked.	Partial.	None.	
S	F	52	?	Post-menopausal	?			×	Patient resorted to former treatment with sedatives, tranquilization and tampons.
W. S.	F	33	?	No	?			×	Patient relieved by ergotamine tartrate.
M. E.	F	46	43	Yes	4 mos.		×		Patient was showing some symptoms of menopause which were relieved.
E. R.	F	47	26	Yes	4 mos.		×		Headaches began 5 months after childbirth.
D. L.	F	27	13	Yes	6 mos.	×			Dysmenorrhea also relieved.
R. R.	F	30	24	Yes	7 mos.	×			Patient's mother has migraine.
C. F.	F	19	14	Yes	6 mos.	×			
E. M.	F	35	14	Yes	17 mos.	×			Gained 10 lbs. in weight.
E. P.	F	45	42	Yes	5 mos.	×			Menopausal symptoms partially relieved.
A	M	50	30	No	1 mo.			×	No other medication relieved symptoms.
I. D.	F	24	16	Yes	2 mos.		×		
A	F	35	?	Yes	3 mos.	×			

note that in these two cases negative results were obtained with emmenin medication.

Several of the patients observed polyuria, some noticed an increase in weight, and a number reported an increased "feeling of well-being." Two cases reported partial relief from various symptoms usually associated with the climacteric. One case which had previously had much dysmenorrhea was greatly benefited. This latter case is given in detail below because of some interesting features:

Mrs. D. L., 27 years, married. The patient's chief complaints are severe menstrual cramps, headache, and backache of 14 years' duration. The menses began at age 13 and were irregular (20 to 42 days) until 1929 when they became more regular (25 to 35 days). Duration of flow 8 to 13 days. Patient has always had severe dysmenorrhea for at least three days and premenstrual generalized headaches lasting from 3 to 14 days. Emmenin therapy was started three days before the period, November, 1933. She did not have the usual premenstrual headache. Similar treatments before the December, January, February, and March periods were followed by complete relief. Emmenin was not available for use before the April period and the patient experienced intermittent generalized headaches for seven days and severe dysmenorrhea of five hours' duration. She was given emmenin again at the May period.

Discussion.

The foregoing results obtained in a series of 18 cases of epilepsy and in 12 cases of migraine have been sufficiently satisfactory to suggest a possible endocrine imbalance as an etiological factor. We wish again to emphasize that these cases were carefully selected as offering very suggestive endocrinological inter-relationship. This point is made because it is thoroughly understood that epilepsy constitutes a symptom and is not a specific disease entity.

It is quite probable that many cases previously diagnosed as idiopathic epilepsy will be found to have some underlying functional or organic disturbance possibly endocrinological in nature. Evidence for this view can be found in the work of Harris [12] and others which has demonstrated that certain cases formerly diagnosed as idiopathic are now known to be due to hyper-insulinism. Such a case was diagnosed in our own clinic and a pancreatic adenoma demonstrated at operation. Its removal was followed by complete recovery.

There is abundant clinical literature, consisting for the most part of case reports, which makes it highly probable that certain cases

of epilepsy may be fundamentally due to some pituitary-ovarian imbalance. The work of Gordon,[6] in 1909, previously mentioned, called especial attention to a group of cases in whom the attacks occurred "with an extraordinary precision within a day or two before the menstrual periods." More recent reports call attention to a similar periodicity of the attacks in relation to menstruation.[13, 14, 15] Other cases have appeared in which the epilepsy had its onset at the climacteric.[8, 16, 17, 18] Epilepsy occasionally arises during pregnancy [19, 20] or the severity of the seizures may increase during pregnancy.[21] In the present series we observed that the onset of seizures frequently coincided with the beginning of menstruation. Many of the patients had complained of irregular or prolonged menstrual periods and of dysmenorrhea. In one of the cases in our series (No. 5103), age 39, seizures developed during one pregnancy at about the third month. She was 27 years old at that time. At a subsequent pregnancy, when the patient was 35, she had no seizures. Following the termination of the latter pregnancy she again began to have seizures. A case having its incidence following normal labor is described by Krettzschmar.[22] Gordon [23] has called attention to the tendency to convulsive seizures during the two opposite periods of life, puberty and the climacteric. Muskens [24] (1928) in his book, *Epilepsy,* devotes a chapter to the influence of menstruation and pregnancy on the occurrence of epilepsy. He cites many case histories to show that there is a high degree of correlation.

While the clinical results in this selected group of cases have been quite favorable we realize that it would be quite hazardous to assume that the therapeutic results constitute specific treatment. In other words, to quote Gordon,[6] "a therapeutic test does not, of course, always prove a scientific fact. . . . ." However, certain observations have been recorded which would suggest that the treatment used may have a scientific basis when viewed in the light of recent studies on sex hormonology. J. Girard [18] has reported a case which developed hyperthyroidism, melanoderma and epilepsy following ovariectomy. It would appear probable that the removal of the ovaries in this case led to a widespread endocrine imbalance and possibly to an associated epilepsy. A more direct relationship between the sex hormones of the ovary and of the hypophysis has been established by the recent experimental studies of Riley and

co-workers [4] on migraine cases, in which they showed that the amount of theelin excreted was generally below the normal level but without relation to the attacks. Anterior pituitary sex stimulating hormones appeared in the urine of their cases a few days before the onset of the attacks and disappeared at or soon after the onset. They also found these latter hormones in the urine of two male patients. Cases with severe, prolonged migraine constantly showed the presence of these pituitary sex-stimulating factors in the urine. Headaches, of a severe character, could be induced in from 4 to 12 hours following the injection of 2 cc. of "follutein" (an anterior pituitary-like preparation) into patients subject to migraine.

At the present state of our knowledge, it is impossible to prove the rationale of the treatment used in the present series of cases. Several possible theories present themselves which may be considered to have a scientific basis.

Recently, much work of an experimental nature has been reported which points to a disturbance of water balance in epileptics. McQuarrie [25] and co-workers have studied this matter intensively. They found that typical grand mal attacks could be induced in a high percentage of mildly epileptic patients by giving water at the rate of from two to five cubic centimeters per kilogram of body weight per hour while maintaining effectively pituitary anti-diuresis. Under these conditions, dilution of the extra-cellular body fluids seemed to be essential to the induction of seizures. The production of a deficit in the body water by any means, led to a temporary cessation of convulsions in severely epileptic children; re-establishment of a positive water balance resulted in a recurrence of seizures. Guthrie [26] has emphasized the importance of water retention in epileptics. It is our opinion, from a critical analysis of the known facts, that the seizures in the epileptics at menstrual time and the association of the migraine attacks with menstruation can best be explained on a concomitant disturbance in water metabolism. Studies on the blood lipoids of normal women during their menstrual cycle have demonstrated that there is a fall in the blood cholesterol a few days preceding their menstrual period and that this is not paralleled by a rise in the blood fatty acids or the lecithin. Bloor, Husted, and McQuarrie [27] have studied the lecithin-cholesterol ratio in the blood of epileptics and have shown that there is a

high ratio preceding and following the attacks. The blood cholesterol was either normal or slightly lowered. The increase in the ratio was chiefly due to the increase of lecithin. Both these constituents have been correlated with changes in the water balance, lecithin favoring water retention and cholesterol favoring water loss. It would, therefore, appear probable that the change which occurs normally at menstruation in the blood cholesterol might favor the development of seizures in the epileptic at menstruation, especially if that individual also had a tendency to develop an elevated blood lecithin.

A number of other factors may be correlated with the view that water retention is responsible for the seizures at the menstrual time. Both clinical and experimental observations suggest that the femal sex hormones (theelin, emmenin, theelol, amniotin, etc.) influence water balance. It has been shown recently that following ovariectomy there is a 25 per cent reduction in the blood volume [28] and that following ovariectomy there is a reduction in blood calcium. [29] It is known that the latter is accompanied by increased vascular permeability. This might account for the water retention in ovarian deficiency. It has been observed clinically [30] that generalized edema may occur at the menstrual period in certain cases. During menstruation the body content of theelin rapidly diminishes.[31] Theelin injections have been used with reported benefit to decrease effusion into the knee joints.[32] In the present series we have been struck by the frequent report that the emmenin produced diuresis, occasionally to a degree where it caused a certain amount of unpleasantness. Taking all these data in the aggregate, it would appear highly probable that emmenin and the related estrogenic hormones favor a negative water balance and that a positive water balance accompanies a deficiency in these hormones and the appearance of epileptic phenomena.

Other hypotheses or theories are possible but they appear less compelling. The fact that ovarian deficiency is accompanied by lowered blood calcium [29] suggests a possible relationship between the latter and convulsive seizures. It is well known that parathyroid deficiency is associated with low blood calcium and tetany. It cannot be denied but that this may be a factor in the cases under discussion.

One of the older ideas has been the theory that epileptic seizures were due to some toxin. Could the toxins be the anterior pituitary sex hormones themselves? These appear in increased amounts in the urine of migraine cases just before and during the attacks [4] and related autacoids have been shown to induce attacks within a few hours after their injection.

CONCLUSIONS.

1. The therapeutic results obtained in a selected series of 18 cases of epilepsy treated with estrogenic substances (emmenin, theelin, theelol, and amniotin) are presented.

2. Marked relief occurred in eight of the cases, all females. Partial benefit was obtained in five others, three of whom were males. Two females and one male patient failed to respond.

3. A series of 12 selected cases of migraine are presented, together with the therapeutic results obtained by use of the above mentioned hormone preparations.

4. Six of these cases were markedly relieved, three were partially benefited and three showed no response.

5. The possible rationale of the treatment is discussed. Alteration in the water balance produced by the autacoids used appears to be the most likely mechanism by which they were effective. Other possible mechanisms are discussed in the text.

6. No claim is made that we have discovered a cure for epilepsy. However, it is felt that the results obtained in this series are significant enough to warrant further investigation in this field.

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A COMPARATIVE STUDY OF SOME OF THE CHANGES PRODUCED BY VARIOUS TYPES OF DRUGS IN SCHIZOPHRENIC PATIENTS.*

By E. F. GILDEA, M. D., H. E. HIMWICH, M. D., O. E. HUBBARD, M. D., and J. F. FAZIKAS.

Indirect evidence has been advanced by Reichardt,[1] Kleist,[2] Loewy [3] and others to indicate that the syndrome schizophrenia is due in a large part to some dysfunction of the brain stem. Histopathological studies of the brains of schizophrenic patients have failed to reveal consistent lesions which might assist in an evaluation of this hypothesis. The symptoms of extensive dysfunction of the autonomic nervous system have been leaned upon heavily by Reichardt and Kleist as indicating a disturbance of function in the centers in the mid-brain which control the vegetative system. It has also been suggested that the low basal metabolic rate found in most schizophrenic patients is determined by this defective regulating mechanism. However, other observers have felt that the generally deficient vitality and lowered metabolism of the schizophrenic patient were due to some special inadequacy of the substances governing tissue metabolism. For a long time the thyroid was under suspicion and Kraepelin was one of the first to treat schizophrenic patients with thyroid extracts and to obtain disappointing results.

When Loevenhart and Lorenz [4] in 1929, observed that small intravenous doses of sodium cyanide produced a temporary remission in the catatonic syndrome they appeared to have additional evidence in favor of an impaired oxygen metabolism in catatonic states because sodium cyanide stimulates before it depresses oxidation in animal tissues. Furthermore, their observation that the

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The operation of the CO_2 chamber was made possible by a grant from the Fluid Research Fund.

breathing of large amounts of CO_2 produced even more striking remissions was also explained on a similar basis. In 1930 Lorenz abandoned the hypothesis previously expressed in association with Loevenhart, and stressed the general effects of deep narcosis as being important in producing the remissions * from catatonic stupor.

In 1929 and 1930 Bleckwenn [5] described the production of lucid intervals in catatonic patients lasting 7-14 hours following single intravenous injections of 0.5-1.0 grams of sodium amytal. There is no evidence that amytal in any way stimulates tissue metabolism, but it does tend to increase the cerebral circulation to some extent and this might stimulate metabolic activity. A more satisfactory, if partial, explanation of the effectiveness of sodium amytal may be derived from the observations of Kesser,[6] Pick [7] and others who have shown that it is a drug which tends to act primarily on the brain stem.

A great many workers, including Lindemann,[8] Langenstrass,[9] Murray and Burns [10] have been able to confirm the experiments of Loevenhart and Lorenz with CO_2, and of Bleckwenn with sodium amytal. A few observers have reported occasional remissions lasting many months following the treatment, but the majority have obtained only the temporary remissions of symptoms as originally described. D'Elseaux and Solomon [11] have studied in detail some of the psychological and physiochemical changes occurring in catatonic schizophrenic patients following the administration of CO_2 and have compared these effects with those produced by nitrous oxide, sodium bicarbonate, diathermy, protein shock and painful stimuli. They have concluded that no one group of physiological changes is responsible for arousal from stupor, and that the only common factor in all of these procedures consisted in a severe shock to the body economy of the patient. They apparently found that a painful or frightening stimulus might be as effective in rousing patients from stupor as the inhalation of a mixture of air containing at least 25 per cent CO_2.

* Remission, as used in this paper, means a favorable change in symptoms and not complete subsidence in symptoms. The character of this change is described in the section entitled "Effects of the Barbiturate-Sodium Amytal."

In the experiments described in this paper an attempt has been made to obtain further information as to the relative validity of the hypotheses that transient partial remissions in catatonic symptoms may be brought about by:

1. Many psychological factors such as fear, painful stimuli, thirst, or any severe shock to the body economy of the patient.
2. Drugs which increase the cerebral circulation.
3. Agents which stimulate tissue oxidation.
4. Certain drugs like the barbiturates which act primarily on the brain stem.

Methods.

Experiments were begun between 8 and 10 a. m. with the patients at rest in bed, and in the postabsorptive state. Samples of blood were taken from the brachial or femoral artery in oiled syringes and transferred at once to mercury sampling bulbs containing as an anti-coagulant sufficient dry powder to make a 0.2 per cent solution of potassium oxalate and a 0.1 per cent solution of sodium fluoride on the addition of 20 cc. of blood. The analyses were begun as soon as the experiment was completed. Glucose was measured by the method of Hagedorn and Jensen,[12] lactic acid according to the method of Friedemann, Cotonio and Shaffer,[13] CO_2 and O_2 by the gasometric technic of Van Slyke and Neill,[14] and the pH was determined with the glass electrode as described by DuBois.[15]

The sodium amytal (Lilly) (Ethyl iso-amyl barbituric acid)* for intravenous administration was made up from the crystalline form as a 10 per cent solution in sterile distilled water immediately before each experiment.

The large amounts of CO_2, 20-30 per cent in O_2, were administered with a tightly fitting nitrous oxide anesthesia mask.

The experiments on the effects of rebreathing air containing 5-6 per cent CO_2 were carried out in a respiration chamber large enough to accommodate two cots and four people and provided with meters, pumps and cooling devices, for the control and analysis of the atmosphere. The patients were wheeled into the chamber

*The sodium amytal used in these experiments was furnished by the Eli Lilly Co.

on stretchers and at the same time the control subject walked in. When the subjects had rested for half an hour the first arterial bloods were obtained. Then the CO_2 in the atmosphere in the chamber was increased to over 5 per cent in about 10 minutes and maintained between 5.6 and 6.4 per cent for half an hour. At the end of the period arterial blood was taken and then the subjects were returned to room air. Half an hour later the third set of arterial bloods was obtained.

The methylene blue (Mercks U.S.P.) was administered in the form of a freshly prepared 0.5 per cent solution in normal saline.

Description of Experiments.

In the beginning of this work a survey was made of the various means by which changes might be produced in the behavior of catatonic patients. It was soon found that for the purposes of this study the patients could be divided into two groups, those in whom a remission of symptoms might be produced quite easily by a number of different methods, and those who only responded consistently to intravenous injections of sodium amytal, or sodium luminal, or the breathing of the air containing 25 per cent CO_2 or more.

The patients were selected for special study after they had been in the care of one of the physicians of the staff for at least a week and every effort had been made to establish a good rapport. If after this period of study, the diagnosis of catatonic schizophrenia seemed well established and the patient showed consistently a number of such symptoms as stupor, mutism, negativism, attitudinizing and other forms of bizarre behavior, the preliminary tests were begun. These were not carried out in a routine manner, but were varied according to the reactions of each patient. For example, some patients would be aroused from stupor, talk intelligibly, and show fear for a short time when an arterial puncture was attempted. Patients in such mild degrees of the catatonic stupor were not used for further study unless, as time went on, their symptoms became more firmly established. It was observed that when a patient did not respond to the administration of nitrogen plus 5-6 per cent O_2 with an anesthesia mask for a period sufficient to produce cyanosis but not unconsciousness, he would

not respond to other disturbing experiences. Later it was observed that the transfer of a catatonic patient to the respiration chamber and the preliminary arterial puncture usually had the same effect on behavior as mild anoxemia brought about with the anesthesia mask. The respiration chamber is an ominous looking mechanical contrivance and usually produced behavior suggestive of fear in the patients who were not in a deep stupor, or in good rapport with the physicians. The patients who did not respond to these disturbing stimuli were considered to belong to a group whose symptoms were sufficiently well established to make it improbable that any of the procedures involved in administering various types of drugs in themselves could account for any changes in behavior that might occur.

In our hands the administration of 20-30 per cent CO_2 never produced more than transient lucid intervals in the catatonic patients. These moderate changes contrasted conspicuously with the remissions lasting 1 to 48 hours which occurred in the same patients after the intravenous injection of 0.6 to 1.0 gram of sodium amytal. In some cases the amytal was given a week before, in others a week or more after the administration of the CO_2.

Effects of Drugs Which Increase the Cerebral Circulation.

Carbon dioxide is one of the most effective of the dilators of the superficial cerebral vessels and there is indirect evidence that at the same time it increases the general cerebral circulation. Histamine is probably next to carbon dioxide in its ability to increase the cerebral circulation. It is safe to assume that these drugs increase the cerebral circulation to a much greater extent than does sodium amytal. Three catatonic patients were given histamine in doses sufficient to produce a marked flushing of the face, dilation of pupils and a fall of 20-30 mm. of mercury in the blood pressure, without a remission in symptoms. These same patients at a later date showed no response to the inhalation of 6-7 per cent carbon dioxide for twenty minutes, yet subsequent intravenous injections of 0.5-1.5 grams of sodium amytal produced lucid intervals lasting from 1 to 24 hours.

Experiments with Methylene Blue and Its Relation to Tissue Oxidation.

As noted in the introduction there is some evidence that the syndrome of schizophrenia may involve some defect in oxygen metabolism. In experiments on animals, methylene blue has been shown to increase oxygen consumption markedly (Eddy).[16] 200 mgs. of methylene blue as a 0.5 per cent solution in normal saline were administered intravenously at the rate of 40 mgs. per minute to patient Fe. No change in the patient's behavior was noted during or after the treatment. Repetition of this treatment with a dose of 400 mgs. also had no effect. A second patient, Wh., also failed to respond to the methylene blue. These patients had developed, on previous occasions, remissions after the injection of sodium amytal.

Response to Anesthetics and Hypnotics.

Of the patients who responded well to sodium amytal six were treated with other types of narcotics such as morphine, paraldehyde and avertin, in doses large enough to produce a moderate state of narcosis for 4 to 7 hours. None of these patients developed lucid intervals, either during or after the administration of these drugs, which could be compared with those following amytal. On account of the consistent failure of these narcotics to produce a remission in symptoms this study was not carried out on a larger group of patients.

Effects of the Barbiturate-Sodium Amytal.

Six patients who did not respond to the methods of treatment described above were chosen for special studies as to the changes produced by sodium amytal. The drug was administered as a 10 per cent solution in sterile distilled water, at the rate of about 0.1 gram per minute. The patients' behavior was carefully watched, and pulse, respiration and blood pressure were followed. In all cases when about 0.3-0.6 grams had been given a marked change occurred in behavior. The face relaxed and a pleasant expression appeared often developing into a smile and then the patient usually began to talk spontaneously and in a relevant and coherent manner.

The administration of the drug was continued until the patient appeared to be unconscious and the corneal reflex was definitely diminished. The period of narcosis lasted from four to ten hours. On awakening the subjects were a little confused, "dopey" and showed a general incoordination of movements. These effects usually disappeared in one to two hours. The striking feature in all of these subjects was the marked change in the general level of feeling tone. The symptoms of mutism and negativism, or of fear and tension, were gone and were replaced by a certain cheerfulness and willingness to cooperate and to talk. Even the obviously suspicious and fearful patients regained their courage and stated that they no longer felt that they might be poisoned or killed. Although the general improvement was marked in all of these patients, traces of their delusions always persisted.

A study of the effects of sodium amytal on the glucose, lactic acid, carbon dioxide and oxygen and hydrogen ion concentration of the arterial blood was made in four of these subjects. Two other subjects were also studied in the same manner. Wa. was suffering from Pick's disease, but previous studies of his reaction to drugs, his metabolism, and sugar, protein and serum fatty acids of the blood had revealed no abnormal features. Be., a psychopathic personality, had recently recovered from an hysterical paralysis and was complaining of headaches and a variety of other minor symptoms. The intravenous sodium amytal made this patient feel much better for several days. While these subjects were not considered "normal" it was felt that they would give a comparative control as to any unusual changes that might be observed in the schizophrenic subjects.

It was found that when small amounts of sodium amytal or sodium luminal (0.4-0.8 grams) were administered the changes which occurred in the arterial blood of the catatonic patients were not greater than the limits of error in the methods employed. Yet these doses always proved sufficiently large to produce an optimum remission in symptoms. In the studies presented in the table large doses were used. The 10 per cent solution of the drug was injected at the rate of 0.05-0.08 gms. per minute and the administration continued until a fall in blood pressure to 60/40 mm. of mercury or a marked disturbance in respiration indicated that the maximum safe dose had been reached. In the 15-20 minutes following the

termination of the injection the blood pressure usually tended to fall an additional 10 to 15 mm. of mercury. From this point on there was a gradual rise, until at the end of 8 to 10 hours the original level had been reached. The changes in blood pressure in patient Fe., which were characteristic of the group, are shown in Fig. 1. The changes in the arterial blood which followed the injection of these large doses are presented in Table 1. There was an increase in the CO_2 content and capacity, a moderate fall

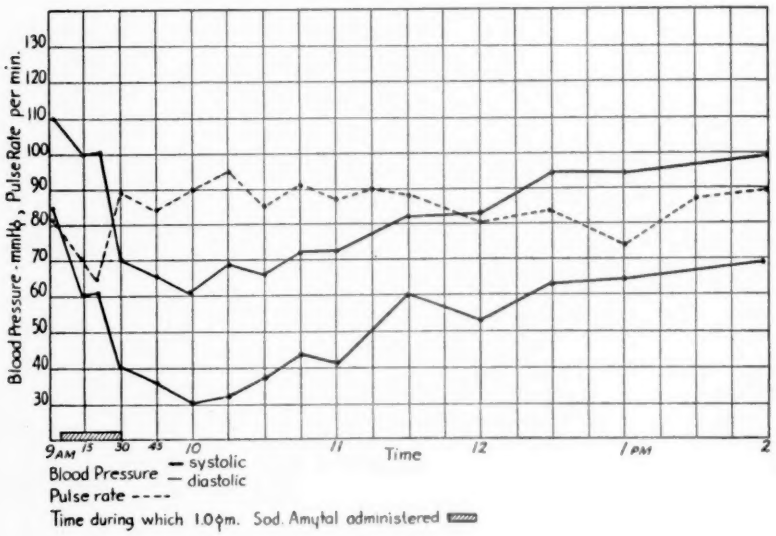

FIG. 1.

in the pH of the arterial blood and a slight fall in the amount of glucose. No change in the lactic acid content was observed. The initial pH values in all of these subjects tended to be a little low. This may be explained by the fact that they held their breath and became tense during the arterial puncture. Wh. on the second experiment was obviously fearful, held her breath and fixed her muscles in a rigid position long before the arterial puncture was begun and this behavior probably accounts for the low pH value. Although this patient had been in a catatonic stupor for many months, she had usually displayed fear and negativism even when washed and dressed.

TABLE 1.

EFFECTS OF INTRAVENOUS SODIUM AMYTAL AND LUMINAL ON CATATONIC SCHIZOPHRENICS AND ON CONTROLS.*

Date.	Doses in grams.	Time after injections.	Glucose Mgs. %	Lactic acid.	CO_2 Vol. %.		O_2 Vol. %.		pH.	Remarks.
					Cont.	Cap.	Cont.	Cap.		
6-24-32		0	123	14	44.99	47.82	17.34	18.99	7.34	Held breath
Wa.	2.20	30′	119	13	49.48	50.05	16.70	16.70	7.31	during art.
Control		4 Hrs.	113	14	47.22	50.06	16.59	16.59	7.31	punct.
Male										
6-24-32	2.20	0	103	16	42.10	46.03	16.73	21.23	7.37	Held breath
Mo.		30′	114	14	45.33	47.95	16.49	21.32	7.37	no struggling.
1st Exp.		3 Hrs.	92	14	44.55	47.65	17.31	21.54	7.36	
Male										
7-15-32	1.90	0	..	..	..	..	..	..	..	Pt. restless,
Mo.		30′	120	22	45.02	46.12	17.52	21.69	7.28	tense, held
2nd Exp.		3 Hrs.	112	24	48.76	48.27	16.10	19.93	7.29	breath during injection.
1-9-33	1.0	0	103	15	46.16	48.65	..	..	7.33	Held breath,
Fe.		30′	103	13	48.63	50.23	..	..	7.31	tense during
Female		4 Hrs.	101	18	47.84	49.86	..	..	7.35	art. punct.
6-27-32	1.0	0	96	30	42.23	43.68	15.56	19.92	7.26	Held breath,
Wh.		30′	98	14	45.07	46.85	15.17	18.30	7.30	tense during
Female		4 Hrs.	92	14	41.98	45.89	15.94	19.61	7.30	art. punct.
1st Exp.										
7-14-32	1.60	0	..	..	..	..	..	..	..	Moved during
Wh.		30′	111	35	49.97	45.47	15.74	20.32	7.18	art. punct.
2nd Exp.		3 Hrs.	106	30	44.16	..	15.02	19.37	7.31	fearful, tense held breath.
6-22-33	Luminal	0	..	..	53.60	48.60	14.07	16.80	7.37	Held breath
Tu.	0.6	30′	..	..	52.80	50.10	14.10	16.60	7.38	during art.
Female										punct.
1st Exp.										
6-30-33	Luminal	0	..	..	54.50	49.70	16.00	18.60	7.37	Held breath
Tu.	1.20	30′	..	..	59.70	52.50	15.10	17.60	7.41	not tense.
2nd Exp.		3 Hrs.	..	..	55.50	49.60	16.10	18.60	7.35	
6-12-32	1.00	0	114	45	41.42	45.42	..	..	7.36	No fear, did
Be.		30′	90	41	43.26	47.43	..	..	7.35	not mind art.
Control		3 Hrs.	99	45	41.40	46.32	..	..	7.30	punct.
Female										

* Control Wa. a patient with Pick's disease.
Control Be. a psychopathic personality without evidence of any other form of disease.

Effects of Respiring Air Containing 5.4-6.5 Per Cent of Carbon Dioxide.

The patients, Fe., Wh., and Tu., who had previously responded with marked changes in symptoms to the intravenous injection of sodium amytal, were exposed for one-half hour in the respiration chamber to air containing 5-6 per cent CO_2. In two of these experiments "normal" young adult males and W. were used as controls.

The introduction of CO_2 into the chamber produced an increase in amplitude of respiration of the catatonic patients and of the control subjects. There was no indication that the patients were less sensitive to CO_2 than were the control subjects. One of the patients, Tu., seemed more sensitive than the others; the respiratory excursions of her chest were more marked and she raised her hand to her head in a manner that suggested the presence of a headache. All subjects showed similar amounts of flushing of the face and perspiration. By the end of the half hour period, the controls, the experimenter who had remained in the chamber and the patients began to suffer considerable discomfort from the prolonged hyperventilation. The controls developed headaches after leaving the chamber; the patients were unable to give any information on this point. Except for some squirming and holding of breath when the arterial punctures were done the patients showed no tendency to come out of their stuporous state either during or after the experiments. The changes which occurred in the arterial blood are presented in Tables 2, 3, and 4.

Abstract of the Records of Patients Who Were Subjects for the Studies Presented in Tables 1, 2, 3, and 4.

We have summarized the history and treatment of patient Wh. in some detail in order to present the method in which the patients were studied. Only a brief description has been given of the condition of the other patients.

Patient Wh.—A white female, age 39, poorly nourished and of leptosomic physique was admitted to the hospital June 21, 1932. She was mute, negativistic and would only move when pulled along by the hand.

History.—The parents were Irish immigrants who had made a good social and economic adjustment in this country. One sibling died with convulsions

TABLE 2.

ARTERIAL BLOOD SAMPLE (1) TAKEN IN ROOM AIR, SAMPLE (2) AFTER ONE-HALF HOUR IN ATMOSPHERE OF 6.4 PER CENT CO_2, SAMPLE (3) AFTER RETURN TO ROOM AIR FOR ONE-HALF HOUR.

10–25–32 Subject.	Blood sample.	CO_2 Vol. %.		O_2 Vol. %.		pH.
		Content.	Capacity.	Content.	Capacity.	
Patient Tu.*	1	42.65	42.08	16.80	20.45	7.40
	2	49.09	37.76	16.96	20.53	7.21
	3	44.44	43.06	16.22	20.25	7.33
Patient Wh.†	1	45.90	45.92	17.35	19.56	7.31
	2	45.33	41.15	17.30	20.70	7.18
	3	42.46	44.31	16.50	20.69	7.35

* Patient tense and held breath during arterial puncture.
† Patient did not become tense and hold breath as on first experiment.

TABLE 3.

ARTERIAL BLOOD SAMPLE (1) WAS TAKEN IN ROOM AIR, SAMPLE (2) AFTER SUBJECT HAD BEEN IN ATMOSPHERE CONTAINING APPROXIMATELY 5.6 PER CENT CO_2 FOR ONE-HALF HOUR.

11–14–32 Subject.	Blood sample.	CO_2 Vol. %.		O_2 Vol. %.		pH.
		Content.	Capacity.	Content.	Capacity.	
Control J.	1	45.03	48.84	18.70	21.83	7.41
	2	49.22	43.47	19.15	21.89	7.25
Patient Tu.	1	43.92	47.10	19.71	19.04	7.35*
	2	52.04	44.08	.....	19.97	7.22
Patient Fe.	1	52.82	52.64	16.79	19.53	7.34*
	2	56.13	50.89	16.92	19.68	7.33

* Patient tense and held breath during arterial puncture.

TABLE 4.

ARTERIAL BLOOD SAMPLE (1) TAKEN IN ROOM AIR, SAMPLE (2) AFTER 30 MINUTES IN ATMOSPHERE OF 5.6 PER CENT CO_2, SAMPLE (3) AFTER ONE-HALF HOUR IN ROOM AIR.

11–21–32 Subject.	Blood sample.	CO_2 Vol. %.		O_2 Vol. %.		pH.
		Content.	Capacity.	Content.	Capacity.	
Control W.	1	45.41	44.38	22.05	23.34	7.40
	2	50.52	43.08	22.14	22.97	7.28
	3	46.23	45.00	21.05	22.61	7.38
Patient Fe.*	1	50.48	49.42	17.35	20.46	7.41
	2	54.04	48.88	18.31	21.03	7.33
	3	51.60	52.24	17.43	20.56	7.42

* Patient did not squirm and hold breath at this experiment as she did on the first occasion.

at the age of 18 months. The patient's early development was not remarkable. She graduated from high school at the head of her class and then became an exceptionally able secretary. She was always quiet, and yet a person with an even temperament who had a few intimate girl friends but showed no interest in men.

Present Illness.—About 10 years before admission the patient's moderate devotion to Roman Catholicism rather suddenly became excessive. She made frequent confessions, talked of becoming a nun, but was discouraged in this by her mother who felt there was something wrong in the character of this religious outburst. This interest in religion gradually quieted down but the patient remained much preoccupied and disinterested in other people. Two years later the patient experienced a severe cold, became weak and inactive, was unable to work for six months. After this the patient worked steadily until three years ago when she developed an upper respiratory infection and in the midst of this became speechless. She recovered in five days. A month later her father died, but she did not seem particularly upset by this event. A month had elapsed when the patient lost her voice again and also became sleepless and restless. Her voice returned in six days but her stream of speech was disconnected and incoherent, and she had a continuous cough. She talked about her work and her mother. A week of this behavior was followed by a state of mutism, negativism and attitudinizing. There were occasional outbursts of incoherent speech. She became incontinent and had to be tube fed. At this point she was sent to a private hospital where she remained for a year. As no improvement occurred she was transferred to a state hospital where a diagnosis of dementia præcox, catatonia was made. During the next two years there was little change in the patient's behavior and she was transferred to this clinic for special study.

Mental Status.—The patient appeared apathetic and mentally retarded as well as incapable of comprehending anything. When left to herself she would lie in bed in one position indefinitely, or if placed on her feet would stand with one foot in front of the other for hours. She was incontinent and required tube feeding. Occasionally there was an expression of fear and apprehension on her face but she remained mute.

Physical Status.—The patient was undernourished. During the first week the patient began to gain weight but there was no change in her behavior.

June 27, 1932, 8:30 a. m.—When preparations were made for an arterial puncture the patient curled up in bed and became rigid as she usually did when an attempt was made to bathe or feed her. It was necessary to hold patient's legs in extension while the puncture was done, and it was obvious that the pain and the whole process frightened the patient terribly. While the blood was being drawn she held her breath and became a little cyanotic. Her pulse rose from its usual level of 80 to 120 beats per minute, and respirations from 17 to 24. The patient did not utter a word during the whole procedure.

The intravenous administration of sodium amytal was begun at 9.15. When 0.5 gms. had been given the expression of fear disappeared, and the patient

mumbled "That's better," and then became somnolent. 1.0 gms. of the drug practically abolished the conjunctival reflex and responses to painful stimuli. A second arterial puncture at 10 a. m. did not disturb the patient. A third at 2 p. m. made patient squirm a little. At 2.30 the patient roused from somnolence, appeared confused and said, "I thought you might kill me last night. I don't like moving from hospital to hospital." Then she went on to discuss her home and how much she loved her mother, etc. "I had a nervous breakdown but I don't know why, I think I am better now." When asked about the people she liked she said, "I like girls, men bore me, I never went out with them much." After a little verbal urging she dressed herself and at 6 p. m. voluntarily ate a large supper. Then she said she was sleepy and immediately undressed and went to bed. On the next morning she at first answered questions in short sentences, but in about an hour she was back in her usual catatonic state. The patient was kept in the hospital for the next six months. During this period the amytal experiment described above was repeated five different times with similar results. A dose of 1.6 gms. on July 14, 1932, was followed by an improvement in behavior which lasted 24 hours. During this remission she asked for stationery and wrote the following note: "Dear Mother: I feel rather shaky today, but I hope I will feel better by and by and I will write you again." She also read a magazine for an hour, and said, "It's about a man and a girl, but I can't make much sense out of it." During all of these lucid periods she showed no apprehension and talked willingly. The only delusions expressed were vague fears that someone would kill her and that the same people might hurt her mother.

Sodium amytal was given by mouth in the same way as described for patient Gau. for a period of 3 months. During the last four weeks she was taking 3.0 gms. per day but did not sleep more than 7-9 hours at night. In this month there was a general improvement. She was not incontinent and her negativism and apparent fear disappeared. She would call some of the nurses by name and showed an interest in the other patients. On some days she would joke with nurses in a natural and understandable manner. Near the end of the month she slowly slipped back into the previous catatonic state. Increasing the amount of sodium amytal had no effect and gradually decreasing the dose for three days also failed. This type of treatment was discontinued. The patient was left in her usual catatonic state for the next three weeks.

October 25, 1932, 7.20 a. m.—The patient was placed in the respiration chamber. She appeared more frightened than on occasion of first arterial puncture, and curled up arms and legs. It was necessary to hold legs out in order to puncture the femoral artery. When the arterial blood had been drawn, the CO_2 in the chamber was increased to 6.4 per cent and the patient was exposed to this for one half hour. The marked hyperventilation which developed seemed to add to the patient's fright, but she showed no tendency to talk and no further change was noted in her behavior either during or after the experiment.

PATIENT MO.—A stout male of pyknic physique, of German Jewish stock and 31 years of age was admitted to the hospital in a condition presenting symptoms of retardation, mutism, apparent apprehension and urinary incontinence. The present illness had begun with insomnia and worry over business affairs about one year previously. Ten days before admission the patient had disappeared from home, changed his name, tried to get a job as a farmer and then attempted suicide by ingesting iodine. During his stay in the hospital long periods of stupor were interrupted occasionally by periods of bizarre activity involving many stereotyped movements and negativism. The patient was mute a great deal of the time, but would burst out with a stream of disconnected, incoherent and usually unintelligible words. A few phrases were repeated again and again, "It's a frame up; on the bottom of the dummy; my head has been cut off; I am dead," etc. Diagnosis: Schizophrenia, catatonia.

PATIENT FE.—A small but well developed and nourished, single, Italian girl of 17 was admitted in a condition characterized by mutism, negativism and tendency to assume awkward postures for long periods of time if left undisturbed. The present illness had begun five months previously with seclusiveness and apparent loss of interest in household duties and family. She became restless and sleepless and would wake her mother because she had heard a man in the cellar. Finally she kept the whole family awake with requests to protect her from people who were calling her names and who were also going to kill her father. She became incontinent of urine and refused to eat. In the hospital the patient remained mute and negativistic and would maintain peculiar postures for hours. She had to be tube fed and was incontinent of urine and feces. There were rare and brief outbursts of talking and fits of laughter. Diagnosis: Schizophrenia, catatonia.

PATIENT TU.—A white female of 39 years of old American and English stock was admitted with the complaint that she had been "framed" and that people were calling her "names." The present illness had begun three years before with a one-sided love affair with a married man whom she had seen only twice. During the next two years she annoyed the man with frequent attempts to arrange a meeting with him. Then she complained that people were talking about this affair and were conspiring to keep the man from her. She made her mother move many times in an effort to escape the people who were conspiring against her. She developed frequent periods of mutism which would last a day or two. Finally she jumped off a 30-foot cliff but broke only a few bones in her foot. Two days after admission the patient became mute, negativistic and refused to eat. She lay flat in bed most of the time and often in one position for hours during both the day and the night. Diagnosis: Schizophrenia, catatonia.

Attempts to Prolong the Remissions Following the Intravenous Injection of Sodium Amytal.

Although previous observers, with the exception of Wilder Bancroft and his co-workers, had failed in their efforts to prolong the remissions following the injection of sodium amytal many of our patients gave such striking response to the first few treatments, that an attempt was made to extend the duration of their improved condition.

Patient Gau.—A male, age 19, who had been in a catatonic stupor for the preceding five weeks was treated with sodium amytal, beginning with 0.2 grams per day by mouth. When no change occurred the amount was increased until at the end of 12 days he was receiving 0.8 gram per day. Practically no change was observed in the patient's behavior, except that his appetite seemed better. At this point 0.8 gram of sodium amytal were given by intravenous injection. A remission followed by a sleep of seven hours and then a period of improved behavior lasting 24 hours was observed. The administration of sodium amytal by mouth was continued and slowly increased until the patient was receiving 1.2 grams per day divided in three doses. After a week on this régime the patient gradually became more active and commenced to eat well, and by the end of three weeks he had become a pleasant and active person. It was difficult to persuade him to discuss his previous symptoms, and he tended to tease the nurses and other patients, but otherwise his behavior was not remarkable. After the patient had been in this improved condition for 16 days the sodium amytal was discontinued. His behavior remained unchanged for the next four days with the exception that he complained of sleeping only three to four hours at night, then it was noticed that he was becoming rather irritable and that he disliked to talk for any length of time with his physician. Unfortunately the patient's family insisted that he was well and took him out of the hosiptal against the advice of the staff. After being at home about one week the patient became irritable, unmanageable, stole two automobiles, but made no attempt to avoid arrest, and seemed unable to give any intelligible reason for his behavior. By the end of three weeks the patient was in a stuporous state again. He was later sent to a state hospital and three months after discharge from this clinic was reported as being in a catatonic stupor. He remained in this condition for about six months and then recovered sufficiently to return home. It has been possible for him to obtain work as an automobile salesman, but recently he has felt that his limited success has been due to people being against him.

This method of giving sodium amytal by mouth was tried in four other catatonic patients but the favorable changes in behavior which occurred were slight and transitory. The failure of the

drug to produce continual drowsiness when begun in small doses and increased gradually was repeatedly, but not invariably, noted in the treatment of these patients, except when 3-4 grams per day were administered. No evidence was obtained which indicated that schizophrenic patients developed a tolerance to sodium amytal more readily than other patients such as those classed as psychopathic personalities or epileptics. Single intravenous injections of sodium amytal in doses of 0.4-2.2 grams were found to produce consistent remissions in all of the 16 patients treated in this manner. The attempts to prolong the remissions for more than 1-2 days by continuing the sodium amytal by mouth, or by repeated intravenous injections failed with the possible exception of the patient Gau. described above. Eight of these patients were kept in a state of continuous narcosis for periods of 5-10 days, except that they were allowed to partially recover from the narcosis for one-half hour in the morning at which time they were bathed and fed and an attempt was made to have them evacuate their bowels. These prolonged periods of narcosis did not produce more complete or lengthy remissions than had the single injections of 0.6-2.0 grams. of sodium amytal. Although great care was used to prevent aspiration of food during tube feeding, or during the vomiting that occasionally appeared after the feedings, a number of such accidents occurred and in one patient pneumonia developed from which he recovered. This appears to be an unavoidable accident when any form of prolonged narcosis is tried—Muller,[17] Weiss.[18] It should be mentioned that at the time the pneumonia developed in this patient the disease was prevalent in the community and that another patient in the clinic who was not receiving any special type of therapy or tube feedings died of pneumonia. Thus, if in the future prolonged narcosis should be repeated with a new type of drug, the treatment should be carried out in the summer or fall and when there is no epidemic of pneumonia. Other types of untoward reactions such as fever, and a mild dermatitis were noted, but in no case were these symptoms serious and they disappeared as soon as the treatment was terminated.

On account of the consistently negative results no attempt has been made to present a detailed report of these efforts to prolong the favorable effects of sodium amytal.

Discussion.

In our preliminary work with anoxemia and the breathing of 20-30 per cent CO_2 it was observed that many of the catatonic patients would be temporarily roused to speak, as though they would try to protect themselves from further unpleasant experiences by talking. This type of remission presented a striking contrast to the change in behavior following the intravenous injection of 0.4-2.2 grams of sodium amytal. With this method of treatment there was no evidence of fear or pain as soon as the drug had begun to take effect, but on the contrary the patients relaxed, their color improved with the vasodilation, their facial expression became normal and often smiling, a pleasant feeling replaced the previous perplexed and fearful or apathetic state and the patients became talkative and willing to cooperate with their physicians. It is evident, therefore, that the change produced by sodium amytal is not due to a "severe shock to the body economy," but is the result of some specific action on the parts of the nervous system which have to do with the general feeling tone of an individual. It was possible to find a number of catatonic patients who would not respond at all to such severe shocks to the body economy, as anoxemia, or being placed in a respiration chamber; or the performance of an arterial puncture, when they were already afraid and suspicious of everything about them. In these patients small intravenous doses of sodium amytal invariably produced the pleasant and favorable changes in behavior we have just described. It is suggested that the effects of severe shocks to the body economy produced in various ways by D'Elseaux and Solomon [11] and by our experiments with anoxemia are different from and less specific and fundamental in nature than those brought about by sodium amytal.

It is noteworthy that other narcotics such as paraldehyde, avertin and morphine did not bring about a partial remission in symptoms following the period of narcosis. Thus it is evident that narcosis alone is not a factor producing lucid intervals.

If we accept the experiments of Keeser and of Pick and his associates which indicate that the barbiturates act primarily on the brain stem; the peculiar effectiveness of the barbiturate sodium amytal in rousing catatonic patients from stupor contributes addi-

tional evidence in favor of the hypothesis of Reichardt, Kleist and others that the catatonic schizophrenic syndrome is a manifestation of some dysfunction of the brain stem. Therefore, it would seem worth while in the future to search for substances which may prove even more effective than sodium amytal in changing the activity of the brain stem.

The experiments with 5-6 per cent CO_2, and with histamine indicate that a mere increase in cerebral circulation cannot alleviate catatonic symptoms. These results are in agreement with those of D'Elseaux and Solomon [11] and with the much more prolonged experiments reported by Cheney.[19]

The failure of the attempt to change the behavior of catatonic patients with methylene blue does not necessarily invalidate the hypothesis that there may be some defect in tissue oxidation in schizophrenic patients, but merely represents another failure to obtain positive evidence on this subject.

Intravenous injections of 0.4-0.8 gram of sodium amytal, amounts sufficient to produce the optimum improvement in symptoms possible with this drug, did not change the CO_2 content and capacity, or the values for pH, glucose, and lactic acid in the arterial blood sufficiently to be beyond the limits of error of the method employed. When larger doses of the drug (1.0-2.2 grams) were given, definite changes were observed in the arterial blood but they differed in some respects from the results that had been obtained by us in previous experiments on animals, Rakieten, *et al.*[20] The rise in the CO_2 content and capacity occurred as it had in the dogs but was less in amount. The pH did not fall consistently and there was no rise in glucose, thus presenting a marked contrast to the severe acidosis and associated hyperglycemia observed in the animals. No change in the lactic acid was found in either series of experiments. This difference in the results was probably due to the fact that it was possible to use much larger doses of sodium amytal (3-4 times in terms of grams per kilo) in the studies on the dogs than could be employed in the work on the schizophrenic patients without the risk of unfortunate sequelæ.

A comparison of the effects of sodium amytal on catatonic patients (Table 1) with those produced by 5.6-6.4 per cent CO_2

(Tables, 2, 3, 4) demonstrates that sodium amytal can bring about marked changes in symptoms, with practically no associated fall in the pH or rise in the CO_2 content of the arterial blood. On the other hand, CO_2 produces no remission in symptoms even when there is at the same time a marked fall in pH and a rise in the CO_2 content of the arterial blood. Thus we may conclude that a fall in pH and a rise in the CO_2 content and capacity of the arterial blood are not factors in producing partial remissions in symptoms in catatonic schizophrenic patients.

It should be noted that the changes which occurred in the arterial blood of the control subjects in the experiments with CO_2 were very similar to those observed in the patients. The slightly low initial pH values in the patients can be accounted for by the fact that they were tense and held their breath while the arterial punctures were being done.

Conclusions.

Evidence has been presented which indicates that the favorable changes in the behavior of catatonic schizophrenic patients following the intravenous injection of sodium amytal are not dependent on the dilation of the cerebral vessels, on the rise in the CO_2 content or a fall in the pH in the arterial blood.

Narcosis produced by a number of different drugs was not followed by any change in symptoms such as occurred after narcosis by sodium amytal.

The changes in symptoms which followed the sodium amytal treatments were found to have a different and more favorable character and a longer duration than those which were elicited occasionally by such severely disturbing experiences as anoxemia, respiring high concentrations of CO_2 or other types of treatment which were necessarily painful.

Since sodium amytal is a drug which acts primarily on the brain stem, it is suggested that its effectiveness in rousing catatonic schizophrenic patients from stupor lends some support to the hypothesis that the symptoms of this disease are due in part to a dysfunction of the brain stem.

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PSYCHIATRY AND THE JUVENILE DELINQUENT.*

By WILLIAM HEALY, M. D.

To what extent has psychiatry any possibilities or responsibilities in solving the delinquency problem? It certainly behooves every group to take a hand in the matter, whether it be councils of parents, educators, business people, psychiatrists, sociologists—as well as those connected with juvenile courts and other social agencies. We must be especially interested in delinquency because of its direct relationship to crime, the particular scourge of our country. It is during the earlier years of the second decade when the offenders who are called delinquents are in the formative period. Then is the breeding time of criminal behavior just as it is the important age for developing wholesome characteristics.

That very little is being accomplished in the treatment of delinquency and for the prevention of crime goes without saying. But then very little scientific or ingenious effort is being directed towards their prevention. I still maintain that if a hundredth of the ingenuity and effort that go into the building up of any of our great business systems were aimed at forestalling criminal behavior trends thoroughly good results could be shown. But unfortunately the returns would only show in terms of better human and social conditions and values; they could not be measured in dollars, which for most of us personally and in national affairs is the sign of success.

On the other hand, in our civilization we are constantly building up certain destructive or at least inimical influences which tend to make delinquency and crime more prevalent. Foremost, of course, is the automobile with all its invitation for adventure and its immense aid to crime, and the movies with their unfortunate effects in many directions, and detailed newspaper accounts of criminals who become actually national heroes for boys who sense the positive aspects of daring, bravery, adventure and cleverness in defeating authority.

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And perhaps more than anything else I should emphasize over and over the ideology of youth as there grows up a desire for easy money, perhaps partly based on the knowledge of how well-known men have seized wealth, or of what occurs through baneful affairs in political life, or of the possibilities of evading legal retribution. Even more important for our young offenders is the growth in crowd and gang life of the spirit of delinquency so that it comes to be extremely hard for any one individual to stand out against the importunities and dicta of delinquent companionship.

In the formation of delinquent careers we are greatly impressed with what might be called the identification of the individual with a social class even if in his activities he leads a lonely life. There is such a thing, we all say, as the criminal class and the criminal himself thoroughly believes so. After some activities in a delinquent direction be builds up this notion which is fostered by epithets and adages such as, " Once a thief always a thief," and with arrest by the police and introduction into court, to say nothing about commitment to a correctional institution, the individual's conception of himself is furthered along the same lines. It is part of habit-formation since recurrent ideas are just as much habits as physical activities. The extent to which this inner process of identification goes varies immensely and partly according to external conditionings. But it is a phenomenon of no little importance.

What has psychiatry to say to all this and what part can it play? If I may be permitted to speak from 25 years of experience and to omit reference to the many publications which cover ground with which all of you are fairly familiar I should like to speak in summary of what these years have shown. It has been a period of fact-finding. Those of us who went into the field with nothing back of us but the older schools of criminological thought have been confronted through sound researches with new conceptions. We are amply assured that the majority of delinquents and criminals are not individuals who are marked by constitutional peculiarities. Psychic elements have been discovered that alone explain some criminalistic careers. We have clearer notions of fundamental human needs and urges that come to play in anti-social behavior. But what about treatment, effectively accomplished or possible?

Investigations of our own and the studies of others show that juvenile court treatment as it presumably aims at the prevention

of delinquent and criminal careers is exceedingly unsatisfactory. There are many reasons for this. Probation service which has been developed especially in connection with juvenile courts is largely inadequate to meet the separate causations of delinquency, particularly as they are interwoven in the individual case. The fundamental recommendations that a clinic may make, based on essential etiological factors, simply cannot be carried out unless there are vastly more resources than usually obtain and unless much more intensive work can be done with families. But then as we have found in our Yale studies, family attitudes and behavior patterns are frequently so firmly established that it is impossible to modify them.

Many times I have said that science, particularly psychiatry, has never had its innings in this field, but it never can have unless in combination with vastly extended legal and social understandings and endeavors. Doing as much as we can with individuals, so often finding familial, environmental, legal and other social barriers to effective treatment, we are immensely restricted in pursuing the path of our best psychiatric endeavors which should be leading to goals of prevention.

And what is being done about the continual flow of recruits to the army of delinquents and criminals? It is perfectly plain from any survey of the conditionings of behavior among our young people that in order to stem the tide of new cases as well as check recidivism there must be widespread changes of general social attitudes and immense lessening of incitements to delinquency and vastly greater provisions for satisfying the native urges of our young people.

If I should review the groupings of definitely psychiatric material as correlated with criminalistic behavior, I should be going over ground already well covered. Enough diagnostic work has been done to show the proportions of the groups in institutional criminal populations. And careers of such a series of abnormal personalities as we reported before the International Congress of Mental Hygiene, for example, attest the value of such nosological entities, their diagnosability, and the predictability of their careers when once started in delinquency. How long must we wait before there is social and legal recognition of such psychiatric facts so that

society may protect itself and save itself from a very definite proportion of expenditures in its immense annual bill for crime? Calculation of the crime production and cost alone of this one category of abnormal individuals would be to render a terribly long account. When we turn to our follow-up histories and note that some of these individuals have been in court 40 and 50 times, or that they have occasionally been committed to a month in a House of Correction—God save the mark about that word correction—or a year and a day to a penitentiary, we are left in wonderment at the ineptitude of procedures under the law.

And it is not only because of the career of the individual himself that we are concerned but because such an individual so frequently even in youth is a center of delinquent contagion for others. In many of our case records we can show the untoward influence of abnormal personalities, through unrepressed delinquent ideation and uninhibited criminalistic energies, upon the behavior of others. Hardly anything stands out more strongly in our opinion than the tremendous need of removal and long-time segregation of those who, classifiable either as abnormal or normal, are continuing sources of delinquent contagion in their given environment.

In all etiological studies of delinquency we come upon the great general fact of multiple causation in the individual case, the polygenesis of delinquency, and it is this very complexity of causation which permits every layman to have his favorite ideas about the handling of delinquents. Those whose pet conceptions of causation are centered either on natural wickedness, constitutional make-up, environmental influences, parental mistakes in upbringing, lack of church attendance, or the failures of education urge their own theories of treatment. And it is these diverse notions that are reflected in legislative provisions, court attitudes and reformatory procedures. A scientific program co-ordinating all stages of dealing with delinquents is nowhere in evidence.

In our Yale studies we have recently been concerned with taking a set of controls, those who have lived in the same family and under the same general conditions but who have not become delinquent. We find no single reason for this any more than we do for delinquent behavior. In these non-delinquents it is always a question of a number of factors working together to produce better

conduct trends. Certain needs, wishes and urges that belong to the particular individual find outlets and satisfactions even in an inimical environment. And there are such variations even among non-delinquents that it is difficult to find general categories under which to subsume the causations of their normally social behavior.

In projecting any satisfactory psychiatric treatment of delinquent individuals often barriers, sometimes unsurmountable, are found in environmental conditions. Even when a main factor is discerned to be the special biological or psychological make-up of the individual, or where a developing or established emotional or ideational pattern is largely at fault, the life situation forms part of the story as far as the production of delinquency is concerned. With either a normal or abnormal individual the environment counts greatly. Just recently, for an experiment, we have undertaken to see what could be done by psychiatric treatment methods with every third unselected case, not feebleminded, coming from the court. Of 14 cases, only two presented problems that we, after a careful case study, believed could be satisfactorily treated in their previous environment. A number of the boys, analyzing their life situation with us, stated frankly that they knew that if they continued to live under present influences they would become further delinquent. They felt that it was impossible for them to stand up under the social pressures that were making, for instance, for automobile stealing or for other forms of larceny. The boys were right; within a month or two, five have already been committed to correctional institutions as a result of further delinquency with their associates. For three, foster homes have been found and they are doing well. The prognosis is extremely bad for the others. This is a pretty picture of so-called civilized community conditions.

As far as psychiatry is concerned it still remains that the most direct method of ascertaining the essential sources of the trouble in the individual case is through studying the mental life, gaining understanding of emotional attitudes and of the ideational content. Only through psychiatric studies can we obtain knowledge of the thwartings and dissatisfactions that underly tendencies toward antisocial behavior. Social studies may render a fair enough account of some provocative milieu and frequently give indication of causations; but then again we are met by the fact, as I have said, that

others in the same environment, even brothers and sisters of almost similar age, may not be finding such thwartings and dissatisfactions. It is the deeper issues of emotional adjustments that are most valuable to explore. The growth of delinquent activities and delinquent ideation frequently arises from roots, the existence and nature of which may be entirely unsuspected even by intelligent parents. Hundreds of illustrative examples could be given, perhaps none better than from the cases of overprotected children, such as the boy too well-brought-up who began to wonder if he really had been made into a weakling and who set about proving to himself that he was and could be a man. Nothing seemed so clear to him as that the criminals he read about in the newspapers embodied the essentials of manhood. So he set about planning and enacting some major crimes and indeed, at 14 years of age "pulled off" several very real burglaries. As Dr. Alexander and I have found in our psychoanalytic researches, some thorough-going criminal careers develop out of personality weaknesses and lacks of accomplishment in other directions. The feeling of being engaged in a desperate undertaking that many would fear to go into wonderfully bolsters up the ego.

If we add to studies of the individual's mental life psychiatric investigations of family attitudes as they have existed over years, and include other surrounding influences, we obtain a pretty complete picture of what goes to make a criminal career. But the technique of these latter studies is also that of psychiatry, for it is not the obvious surface conditions that count so much, it is the deeper feeling-tones that accompany human relationships. Never shall I forget the account rendered of a certain mother by an old-school social worker who described the woman as perhaps the most slatternly she had ever seen and the home one of the most disorganized from the standpoint of ordinary care and up-keep. And yet this same woman, as we later knew full well, was the chief anchorage of her boy who had been led into delinquency by companions and was the one influence to whom he has always given credit for his chief stimulation toward a remarkably good career which he afterwards achieved. A well-trained modern psychiatric social worker (the investigation occurred many years ago) would have taken deeper soundings of the responses back and forth between this mother and son, and would, more than likely, have produced evi-

dences of the fundamental emotional structure that lay beneath superficial appearances.

But much deeper rooted than anything else are the obsessional impulses to crime which sometimes develop in individuals who are entirely normal from the standpoint of ordinary psychiatric classifications. Some of the worst criminal careers with which we are acquainted have grown from such roots, as is shown by some of the instances which we have recorded. I have recently received a very extensive autobiography from a fellow now serving a long term in a penitentiary. It is a most revealing document of criminalism entered into as a definite professional occupation, hazardous but thoroughly enjoyed, written by a man who proposes frankly to prey further upon society after he is out. And this comes to us because we knew him as a boy of 12 or 13, tight-lipped, evidencing some deep emotional conflict which we recorded but had no chance to explore under the conditions of court detention. He had already the full urge to become anti-social—and certainly his urges have been given complete sway under the inefficient modes of dealing with such cases. In and out of institutions he readily found others criminalistically inclined and his autobiography includes stories of the activities of scores of other criminals, as well as the interweavings of cheap political influences, weak court attitudes, the chicaneries of criminal lawyers, and penal maladministrations—all of which combine together to make possible the steady growth of careers which cost society untold amounts.

Obsessional cases are usually more solitary in their anti-social activities. They do not enter into gang associations as a rule, although since crime is ordinarily more easily carried out if there is companionship they may seek associates. Criminalistic compulsions are quite as strong as those witnessed in the ordinary compulsive disorders which come to the attention of psychiatrists. No ordinary legal or penal measures deter, no ordinary treatment cures. Most astounding histories of repetitions of criminal acts, sometimes stereotyped, sometimes not, can be read. The need for punishment is much in evidence, that need which psychoanalysis brings out so clearly, but with punishment comes a renewed permission, as it were, to offend. Ordinary deprivation and suffering, quite aside from legal punishment, means nothing to such individuals, any more than self-deprecations, self-abnegations, and promises to

reform. Some such obsessional individuals, even when well-endowed physically and mentally, or when in fair economic circumstances, take definite flight from the chances for success.

With these mental conflict cases there is a splendid field for psychiatric work that has hardly as yet been opened up. First we are concerned with how early these cases can be discerned as such, and how to get enough control so that they can be worked with for a sufficiently long period. We are not yet ready to say that early in their careers a prolonged psychoanalytic procedure, similar to that undertaken with adults, is necessary. Years ago I published cases in which some outcomes were very gratifying following a much shorter procedure and I am inclined to believe that this still holds true for many. Until more cases have been treated we hardly need judge by the work of child analysts with highly neurotic younger children. It may be that the conduct problems involving what we call delinquency can be more easily resolved. In the case of a boy of 15 who on the basis of conflictual urges had embarked on a lurid career of criminalism most admirable results were achieved through some 30 psychiatric sessions with the boy, 26 interviews of social workers with the parents and brother, and 14 contacts with others. As in many another case a period of placing away from home seemed necessary, in this instance from what superficially considered was a good family life, but this placing was merely to give a more favorable impetus to the psychiatric treatment which eventually corrected the attitudes of the parents and the delinquent

And the problem arises again and again: will it be sufficient to deal alone with the delinquent, as one might possibly do if there were resources for psychiatric work of the analytic type in correctional institutions? Only too often the individual's emotional life is enmeshed with that of the family. It is only the more intelligent parents who come to us asking for help themselves in dealing with their children. Extremely few parents in court cases will acknowledge that the delinquency of their child is at all due to their own attitudes and behavior. Can there be better general education in this respect gradually built up? If the delinquent were studied to the extent that such internal family relationships came out as clearly causative, perhaps there might be an introduction to treatment of the parents, even under the auspices of a psychiatrist in a correctional institution. I have in mind one delinquent boy from the

court who, exploring his mental life with us, was able to gain insight into his relationships to his mother. She in turn being confronted with the situation was able also to gain insight into her attitudes. The alteration of her behavior tendencies was the first step toward better behavior on the part of the delinquent and the modifications brought about have persisted most satisfactorily. But unfortunately such instances are rare.

I am constrained to wonder whether judges of juvenile courts, educated in these points of view, might not be most helpful in challenging parents as well as delinquents to obtain psychiatric guidance. In our Yale clinics I sometimes questioned whether more would be accomplished if the court could or would take a stronger hand in regard to familial behavior and yet, after all, it seems senseless to talk about the enforcement of modification of emotional attitudes, even under psychiatric analysis and guidance.

The whole matter of how effectively to deal with delinquents whose conduct arises from deep-lying conflictual drives is not yet clear because of the interference of externally imposed conditions through the exigencies or alleged exigencies of school regulations, court procedure, probation service or correctional régime. How clear the difficulties appear when in correctional institutions there exists the typical regimentation of delinquents, all considered alike, save for certain gross classifications; all to remain for pretty much the same period! The spirit is that of blind legal justice—supposedly regarding all men alike. Again I say that science has never had a fair chance in this field and that it is high time that fair opportunities were made for it.

Most of the clinical service offered by us and others for delinquents has been in the nature of diagnostic evaluations and recommendations offered to the court. We know that the fundamental recommendations are very seldom carried out by probation officers, not so much because of lack of belief in them or unwillingness, but because of insuperable obstacles. In the light of this we do not in the least wonder at the amount of recidivism which is discovered through following up the cases over the years.

Considering the total number of delinquents who appear before the juvenile courts it must be acknowledged that, on the whole, comparatively little psychiatric treatment is carried out. The amount

of time and patience necessary for good psychiatric service is quite beyond the capacity of most psychiatrists to give. As it stands now, where psychiatric problems are involved, by far the greatest amount of work is being done by psychiatric social workers. Their success in many instances is admirable and we conjecture whether the great field for future development in the treatment of juvenile delinquency is not through well-trained psychiatric social workers. Their meetings with parents, who pour out for hours the stories of their own feelings and attitudes and behavior patterns, relieve tensions and make for the possibility of a new growth of attitudes, so much so that only a minimum amount of time may be necessary to be taken with the delinquent. Of course, there are great variations in different cases but one cannot undervalue the possibilities of the part that these psychiatric social workers may play in the future development of psychiatric treatment of delinquency.

In all this I would not in the least minimize the rôle of situational influences as they directly affect the thinking processes, the emotional life or the activities of young people. To do so would contravene common sense; the incitements to delinquency and crime are so extensive. Following the exploitation of the Gerald Chapman case in the newspapers there was a very general epidemic among youngsters of playing the "Chapman game." We ourselves had numbers of boys from the court who engaged in delinquency patterning after Chapman. Some little crowds used to argue back and forth concerning whether or not he should be sentenced to be hanged. It is much the same as in my boyhood days when Jesse James and his gang were heroes for us through the dime novels built up on his exploits. Just now it is Dillinger. An adolescent of very good family said the other day that Dillinger was such a real fellow that he hoped he never would be caught. In Charlestown, across the river from Boston, there is a street on the side of Bunker Hill where "looping the loop" in stolen automobiles has been a common practice for years in spite of barriers put up by the police and shootings and fatal accidents. The spirit of the local youth and of the community is such that grades of distinction have been established among delinquents, the lower including those who take automobiles for short "joy rides," the topmost those who dare to speed past the "cops" at sixty miles an hour. The newspapers stated that a thousand people had gathered recently

to watch the performance which had been secretly announced, again resulting in a bad accident. Perhaps the best thrill of all was that obtained by boys who stole a fire captain's red automobile and dashed through the streets of Boston, clanging the bell, ending up by "making the loop." For us in America evidently great distinction is to be gained through delinquency and crime.

After all we must realize that the adventurous type of delinquency and crime which is so characteristic of America somehow strikes a responsive chord in our unconscious desires and urges. If it were not so we should not be so interested in following the details of notorious criminal careers. We thrill to the contest, to the struggle for superior achievement, to the story of the daring. Any warfare on crime that is to be successful must be based upon what psychiatrists more than anyone else have to teach about the fundamental needs and urges of mankind. The essay of William James on the "Moral Equivalents of War" aroused much interest and likewise we need to consider the socially permissible outlets for the criminal impulses which are within all of us. In modern days we have so thwarted the chance for youthful adventure at sea or on the frontier and through our machine-made homes we have so limited the necessities for responsibility, and we so fail to work youth as was done in apprenticeship days, that the free floating energy of exuberant youth can readily be charged with impulses coming from unconscious instinctual life that lead in the direction of delinquent and criminal activities.

Perhaps the most promising remedy for this is through the development of community projects for youth. We look to those that are started with a very great deal of interest in possible achievement. However, the workers who are best versed in the causations of delinquency and who are engaged in such projects definitely insist that psychiatric clinics are necessary in co-operation because of the facts that I have already mentioned, namely, that certain individuals turn to delinquency more on account of emotional dissatisfactions and internal conflicts than for any external reason. And other delinquents who are at least to some extent abnormal prove under most environmental circumstances to be tremendously active sources of delinquent contagion. There are many delinquents who are really sick individuals, some with constitutional defects and

ailments that require long-time segregation and steadying treatment, others that are in many senses like our neurotics needing their internal problems solved.

DISCUSSION.

DR. ERIC K. CLARKE (Rochester, N. Y.).—I will limit myself to just one small phase of this whole question, that is, to say a word for the correctional school side of the question, because we have come in for a good deal of criticism to the effect that correctional schools are failing badly—and the criticism is justified.

When we first started in this work it was with the idea that we should work with the individual, try to solve his problem; but as time has passed, circumstances have forced us to swing to the other side, that is, to realize that the staff of the correctional school must be educated before you can hope to do much with the individual, because the individual members of the staff have the major contact with the boys, and can so successfully undo all that we may accomplish within the clinic.

The second point is, that we spend a great deal of money unwisely, because we do not have the type of trained personnel to carry out the work. We need people with much higher educational standards, and a great deal more training to carry out the finer details.

I think that the whole system of correctional schools must be revamped, but that is a slow process. So that our policy now has swung from particular stress on the individual into education of the staff; second, classification; third, individual work; and lastly, research, which must be kept in a separate group from the organization that carries on the routine of the institution.

DR. HARVIE D. COGHILL (Richmond, Va.).—I think I was asked to discuss Dr. Healy's paper because of a local situation. I am from a city of about 180,000 population, with a juvenile court that has been handling about 2000 juvenile cases a year. In contradistinction to other cities there has been a reduction in juvenile delinquency during the past three years. Our child guidance clinic has a staff of 15 of which only seven are fulltime. We receive about 200 children from the court each year. The responsibility for treatment is shared between court and clinic, which as Dr. Healy has intimated is exceptional.

We owe a debt of gratitude to Dr. Healy because of the formulations which he has given us so clearly for so many years in the field of juvenile delinquency. It is not the fortune of many pioneers to see so many of their dreams realized. I doubt if Dr. Healy knows the extent of his influence in this field. Year after year, for a quarter of a century, he has been translating his practical experiences and formulating his basic philosophy in the treatment of juvenile delinquents, presenting results and conclusions before groups like this; and year after year, such groups have gone back

to their practice and have endeavored to translate into terms of their own working experience the lessons learned from Dr. Healy. Always he has spoken in a language which even intelligent laymen could understand. Here is an example: Twenty years ago, while I was a probation officer of a juvenile court, the judge of the court told me of Dr. Healy, and put some of Dr. Healy's work into my hands with this commendation: "Here is a psychiatrist who hasn't lost the human touch."

It might be interesting to follow the careers of all the probation officers of that court. Some of the most brilliant young attorneys in the state have come under its influence; a judge of a juvenile court, and a judge of a superior court; several members of the legislature, and other men high in the councils of the state and city.

I had the pleasure of serving that court, first, as a probation officer, later as a psychologist, and then as a psychiatrist, and now as director of the Child Guidance Clinic. Treatment of the children sent by the court is a joint responsibility. In this the Richmond situation is unusual because in most cities responsibility is vested solely in the court.

We have for sometime felt the need of such a formulation as Dr. Healy has presented today. The first clinic cases that we received were selected by the court in a haphazard and hit-or-miss fashion. The emphasis was always on speed, in order that a quick decision might be made by the court. A very potent influence in changing this custom was the application of some of the methods that Dr. Healy has always advocated. In this case, the judge readily accepted, partly because he could see the need of a more selective method of choosing cases for study, and partly because of the magic of Dr. Healy's name. Later, use was made of the classification as delineated by Alexander and Staub. It will be recalled that they classified delinquents as chronic and acute. Chronic they placed in three large classes: first, the neurotic delinquent, whose hostile activity against society is the result of struggle between the social and anti-social components of his personality; this conflict, like that of a psycho-neurosis, coming from impressions of earliest childhood and from circumstances of later life. This they term the psychological etiology.

Second, the normal delinquent, whose psychic organization is similar to that of the normal individual, except that he identifies himself, as Dr. Healy points out, with criminal prototypes. This they term the sociological etiology. We have in Richmond a section known as Little Chicago, and we find that some of the children from that section belong to this grouping.

The third grouping they term the pathological etiology. In that class are some types of schizophrenia, and some forms of epilepsy.

As a matter of fact, every human being, without exception, under certain conditions and situations, is capable of a transgression of the law. We don't have to go back far in the history of our nation to see some examples of that. The outstanding factor in such delinquency is not the peculiarity of the person who committed the offense, but the singularity of the cir-

cumstances which led up to it. Such classifications as this, and the one outlined by Dr. Healy, are, I think, of practical importance in order to make a correct diagnosis of a delinquent of any type. In acute cases, one need not undertake any special treatment, or take any measures in order to avoid repetition of a delinquency, except sometimes to repeal an unpopular or bad law.

However, in other types, it is absolutely essential that a correct diagnosis be made in order that treatment may start at once. This requires time. We have found Judge Ricks of the Richmond Juvenile Court most cooperative in postponing trial for months, and in some cases continuing the case indefinitely, in order that the clinic may have ample time in which to study the child.

As an aid to diagnosis, and also for treatment, in some cases, we make use of a therapeutic workshop in which there is at present an enrollment of 60 children. Through means of occupational therapy, these children are kept interested, and an opportunity is presented to observe them under more normal conditions than in a formal interview. This shop was started seven years ago under the joint auspices of the Children's Memorial Clinic and the Richmond Chapter of the Junior League, and is financed by the Junior League, the professional staff being furnished by the clinic. The psychiatric social workers of the clinic, by the way, bring most of these children to the shop, and take them from the shop back to their homes, and are in constant touch with the homes. Also, they aid in the treatment of parents, so far as possible, where such treatment is necessary. Children selected for study and treatment in this shop range in age from 7 to 12, approximately. Those 13 to 18 are treated by office contacts, and, of course, by social treatment, and other forms of therapy, as indicated.

The fact that there has been a reduction in juvenile delinquents in the past three or four years of 700 cases per annum is probably in response to community cooperation; installing a crime prevention officer, making a spot map, for instance, of the city, locating the sore spots, and trying to eradicate them, providing more playgrounds, and providing for the needs and the desires of these children so far as possible.

We have learned by costly mistakes to dig deeper into the inner lives of delinquents. When I took office in 1920 at the state prison, one of the first inmates I examined was a former probation officer. This experience was repeated too often for comfort in those unphilosophic days that followed. The next most significant change in my philosophy occurred after I had in an unorthodox fashion analyzed an inmate who was reputed to be the worst young devil in prison, always trying to start a riot. With 25 years to serve, he felt that he had nothing to lose. He had been diagnosed by psychiatrists on the outside as a psychopathic personality, but there was no statement about any mental mechanisms or processes, and after 12 months of treatment, during which time there gradually came to the surface the fact that he had been fighting his father in all his contests with the law (at least that was his conclusion), a change began in this boy of 19. In two years, he had evolved workable plans for rehabilitation, and when

he came up for conditional pardon and parole, was released with 19 years of his sentence still unserved. When last heard from, he was reputed to be a good citizen. This case helped to sell mental hygiene to the prison authorities. This man they had termed one of the worst men in the prison. (They don't like a man who starts riots constantly.) Because under treatment he changed from a very riotous individual to one who conformed to all the rules, they decided that mental hygiene had something to do with it.

The lessons learned from this and similar cases have helped me to develop a more seeking attitude in studying the personality of young delinquents; and as Dr. Healy has shown today, that is what we must do, if we are to help them find themselves; help them to forsake the weaker part of the community with which they have been identified, and to adjust satisfactorily to the stronger part of our society. But they must also receive, as Dr. Healy so ably points out, the cooperation of all of the social forces of the community.

THE SYMPTOM OF LOSS OF FEELINGS.

A Gestalt Interpretation.

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One of the most remarkable types of depression which the psychiatrist is called upon to study is the type where the patient complains not so much of a depression, but of a complete loss of feelings. One of the most astounding complaints of these patients is that they cannot even feel sorrow, that even the emotions of sorrow and sadness have been lost in the total annihilation of their feelings. This symptom complex is well known and has been variously described and classified. We quote, for example, from Jaspers in his section on the disturbances of feeling and feeling states:

> The feeling that there are no more feelings, a subjective stoppage of feeling, is a very remarkable phenomenon which appears especially in periodic psychopaths, but also in the beginning of all processes. The patients complain that they cannot experience any more joy, any more pain. They feel no more love for those near to them; to them everything is indifferent. They feel desolate, empty and dead; they find no more pleasure in existence. They complain they have no more inner sympathy, no more interest. Moreover the patients suffer prodigiously amid their subjectively experienced dearth of feelings.[1]

One of Brachet's patients gave the following account of her feelings:

> I still continue to suffer constantly; I have not a moment of comfort and no human sensations. Surrounded by all that can render life happy and agreeable, still to me the faculty of enjoyment and of feeling is wanting—both have become physical impossibilities. In everything, even in the most tender caresses of my children, I find only bitterness. I cover them with kisses, but there is something between their lips and mine; and this horrid something is between me and all the enjoyments of life. My existence is incomplete. The functions and acts of ordinary life, it is true, still remain to me, but in every one of them there is something wanting—to wit, the feeling which is proper to them and the pleasure which follows them. . . . . Music has lost all charm for me, I used to love it dearly. My daughter plays very well, but for me it is mere noise. That lively interest which a year ago

[1] Jaspers, Carl: "Allgemeine Psychopathologie." 3d ed., 1923, p. 83.

made me hear a delicious concert in the smallest air their fingers played—that thrill, that general vibration which made me shed such tender tears—all that exists no more.[2]

This symptom complex is very well illustrated in the following 18-year-old neurasthenic.

About one month after her admission, the patient complained of a constant feeling of exhaustion. She began experiencing difficulty in concentration; could, for example, no longer follow the dramatic sequences of the motion pictures she saw. She said that she was no longer able to enjoy life as she formerly had. She then complained of headaches. Gradually she complained that she could not think. She finally became so depressed that she was hospitalized.

On admission, she was described as a slender, rather tall and well-developed girl, normally brisk in her movements and at times even animated in her speech and gestures. Her voice and manner were always easy and agreeable and bespoke a cultured background. She was always interested in her personal appearance. She complained that she had lost the ability to think; no thoughts ran through her mind for hours at a time. She felt dead-alive and nothing aroused any feelings in her whatsoever. Things formerly held as pleasant, beautiful or even sacred no longer had any emotional meaning.

The patient's loquaciousness and animated speech and gestures were difficult to understand in the face of the dramatic symptoms she expressed. It was also noted that she was always correctly oriented, did not hallucinate and was never deluded. The patient always insisted that she was not really insane. After a two-month residence she suddenly cleared up, became her normal cheerful self and was paroled.

Here again we have illustrated quite typically the symptom of loss of feelings. It is typical also that there is something paradoxical about the picture, for in talking to this patient, one was quickly convinced that feelings in the broad sense of the word were not altogether lost. The dramatic, lively and often vehement manner in which these patients describe their symptoms shows clearly that feeling of some sort must be present. It is certain that these patients have feelings and yet something very essential has dropped out of their mental life, a vastly essential something that calls for further study.

But first of all, let us point out the difference between these melancholics " without feelings " and the more usual type of melancholic. Often the appearance is strikingly different. In the patient

[2] Quoted by Semal: " De la sensibilité générale dans les affections mélancholiques." Paris, 1876, pp. 130-135.

mentioned above we noted the animated facies and wealth of gesture and expression totally out of keeping with the anguish described. Mentally there is one important difference, possibly two. The feelingless patient complains of an inability to feel. On the other hand, the usual melancholic has plenty of feeling although of a sad, gloomy coloring. "In general depression, all experiences, inner and outer, are toned with psychic pain of various kinds." (Bleuler.) A second symptom, although apparently a secondary one, is a paralysis, or at least a benumbing of the thought and phantasy drives. We have always been able to demonstrate this symptom to a certain degree. For example, the patient will describe himself as sitting like a log for indefinite periods without a thought, or just a vague awareness of the surroundings and an ever-present awareness that the psychisms have suffered some crippling alteration. Another impressive feature of these cases is their complete insight, of which they seem to have too much for their own comfort. Depressive delusions of sin, disease, etc., are never present. One of the complaints of a "feelingless" patient of four years' standing was that she could not become insane. The other women around her with their delusions at least had some sort of mental life, however warped, while for her, "everything had been lost."

These patients "without feelings" stand apart from the more usual depressions which for the purposes of classification and distinction, might be called "rigid" depressions in view of the unvarying psychic pain and worrisome thought stream. And yet the more usual, rigid depression is apparently much closer to the normal and in fact phenomenologically seems nothing more than a morbid exaggeration of various worrisome states universally present in all "normals." But the feelingless state also has points of contact with the normal which will be touched upon later.

But to return to the symptoms of "loss of feelings." Exactly what sort of feelings have these patients lost? In all cases, questioning will bring out the following. What is missing is that quality or part component which ordinarily gives consciousness its qualitative richness. Practically, our problem narrows down to this. What is it that will give a cross-section of normal consciousness, savor, piquancy—in a word, qualitative richness? The precise nature of this component we do not know. We propose, however, to make

it the subject of our speculations. Whatever its nature, it is lacking in these patients making their mental life seem drab, hollow and "tinckly."

To make our concept clearer, let us take an analogy from the physical world. Before us, let us say, there are two pianos upon which the same melody is being played. One instrument is intact, *i. e.*, it is normal; to the other instrument, something has happened which has damaged its sounding board. Now it is obvious that in the two cases, the same melody will sound different. This difference will be a matter of richness of timbre. With the one instrument, we will have a certain richness and sonority which we normally associate with the tone of the piano; on the other instrument with its damaged sounding board, the same melody will be flat, "tinckly" and uninteresting. Time and again, these patients "without feelings" have acknowledged the justness of this simile. Their thoughts, memories and perceptions are the same as before their sickness, *i. e.*, their cognitive, intellectual "shape" is the same, the profound alteration existing in a certain lack of warmth or richness which normally goes along with these activities.

This quality of richness can easily be demonstrated in normal consciousness. Memory shows it especially well. All of us, for example, have memories which are richer and more pregnant with feeling than others—memory islands, charged with affect, that stand out from the usual run of conscious experiences. As a matter of fact, healthy consciousness is never completely flat and colorless. Introspection will always discover a substrate of feeling, a definite feeling tone which is always present. This qualitative feeling component (corresponding to timbre in our musical analogy) we shall call the mood fringe or mood component because of the tendency of these feelings to last and endure, persisting often for considerable periods of time through the phenomenal flux. This is a peculiar quality of moods, persisting as they do and maintaining their individuality while the other contents of consciousness is in constant change.

In these mood fringes we also see another quality. For we find that no simple hedonic yardstick can measure them. Some of the richest and most piquant experiences are an almost exact balance of pleasure and pain. These are not mere "joys" or "sadnesses" of varying intensities tacked on to experience. One is tempted to

expand Wundt's tri-dimensional scheme of the feelings and add another dimension or "yardstick," This would be *richness-flatness.* At the one extreme would be the emptiness of mood seen in our patients; at the other, would be the rich and powerful feeling fabrics of the poet and esthete. Thus it will be seen that richness of feeling, this quality of the mood fringe, refers to something quite different from the "simple" emotions—love, fear and anger.[3] These "simple" emotions may be present and may even have considerable intensity without having this quality of richness.

For the understanding of these mood fringes we find very little to help us in most academic psychology. To some extreme behaviorists with their denial of consciousness, the problem of these feeling qualities would not even exist. To others, who belong to what might be called the "commotional school," apparently only gross affective explosions are accepted as emotions. This school delights in such situations as chance encounters with grizzly bears or aeroplanes falling out of control; in a word, situations producing tremendous and stupefying influxes of feeling. Thus to such an exponent as the American D. T. Howard, such emotions, or as we prefer to call them, commotions, are completely useless, unfortunate by-products of the animal's nervous economy.[4]

Freudian psychoanalysis with its secondary stress on phenomenology is also of little direct help. To be sure we can formulate the problem of the mood fringe in terms of libido mechanics, *i. e.,* we can reword our problem in psychoanalytic language, but that is as far as we can go. We might investigate the present dramatic situations which call forth a certain mood fringe, we might analyze the interpersonal factors—their genesis and development from infancy on—we might even be able to cure a neurosis on the strength of this analysis—without really touching the core of our problem.[5] The

[3] Cannon, Walter B.: "Bodily Changes in Pain, Hunger, Fear and Rage." New York, 1929.

[4] Howard, D. T.: "A Functional Theory of the Emotions." Wittenberg Symposium, 1927.

[5] The same criticism would apply equally as well to any hormic approach to the problem. (*Conf.,* the closely related hormic system of William McDougall.) It may be said of both schools that any description of our problem they might have to offer would of necessity be an atomistic, summational one not valid in terms of the gestalt dynamics which are the essence of these feeling phenomena.

nearest psychoanalytic concept which touches our problem is the sublimation concept, according to which the mood fringes would result from the deflection of some primitive, forbidden drive from its goal. This concept would seem to be more clearly applicable where single, fairly isolated objects, flagpoles, hills etc., were stimulus objects, not where more extensive configurations were concerned, *e. g.,* the "atmosphere," or mood fringe connected with place; nostalgia and other similar moods.[6] These latter, however, are some of the richest and most poignant of the emotions. Moreover they are notoriously absent in the moodless state.

Finally, we should consider the sensationalists. According to them, these complex mood phenomena, wherein we saw the qualitative richness of experience to lie, would be composites, would be the sum result of many simple feelings and sensations being added together. As this school saw it, the problem of the psychologist was one of analysis, of analyzing the complex into an ever-decreasing number of atomistic elements. Among such irreducible elements, for example, Wundt named, besides the simple sensations, "elements of feeling": pleasantness, unpleasantness, excitement, relaxation, tension and calm. Later on, Wunda felt himself obliged to add special processes which he termed cohesions. Apparently sensing the failure of this discrete, atomizing approach, these cohesive processes were added to bind the feeling fabric together. With different investigators at different times, these "elements" have had different names; "sensations" of various kinds (James, Stumpf, Claparede, Tichener, etc.), psychological residues of various kinds, or *e. g.,* Herbartian blocklike "imaginations." Thus according to these analytical schools the rationale is always the same. All mental complexes of which the mood fringe is an example are to be considered arithmetical summations of simpler elements. The business of psychology is, then, to find these elements by analysis. This is the famous "atomistic" view, at the present time in full rout before the forces of the various configurational schools. These newer con-

[6] In other words, the sublimation concept seems more applicable to æsthetics in the narrower sense—to the æsthetic appraisal of fairly isolated objects. (*Conf.* Ferenczi's treatment of the development of symbolism in children. "Sex in Psychoanalysis." Chapter on symbolism.) But even here, how explain a "good" gestalt or a "bad" gestalt, how explain the phenomenon of gap completion?

figurational schools—whether gestalt, ganzheit, or whatever name they may carry—have discovered that in organized wholes there inhere certain properties which are peculiar to these wholes and which cannot be otherwise described.[7]

Now when we consider these richness giving mood fringes from this newer viewpoint, we seem to have the key to the problem. For subjectively these experiences fill the whole breadth of consciousness and are peculiarly related to cross-sections of consciousness only when taken as wholes. For this view, we are largely indebted to Felix Krueger, Wundt's successor at Leipzig, whose experiments largely dealing with feeling and which go back over a period of more than 30 years, have gradually given rise to and confirmed this point of view. According to Krueger, " feelings are the complex qualities of the total-whole, of the experienced totality." [8] And we find that this applies preëminently to the mood fringe. Thus, whether the attitudinal pattern is concerned with perception, reminiscence, directed thinking or otherwise, we find that the mood fringe is related to the total process, or global attitude of the mind.

For the purpose of illustrating these concepts, we shall now present some material, consisting of two samples of mental activity. We shall try to demonstrate those sounding board qualities, or better, mood fringes, in these two forms of mental activity wherein we believe the qualitative richness of the experience to lie.

For example, as these notes were being written, I should describe the mood accompanying the actual stream of consciousness as rather flat and uninteresting. To be sure there is a certain tenseness and alertness present, mood qualities which characterize all directed thinking. Possibly this mood can best be described as a mild undifferentiated excitement.[9] Moreover this mood seems to have very little direct connection with the constantly changing stream of

[7] Read Krueger: "The Essence of Feeling" in the 1927 Wittenberg Symposium for a good critical survey of the atomistic *vs.* the holistic approach to the problem of feelings and emotions. Also for a more developed account: F. Krueger, "Die Tiefendimension und die Gegensätzlichkeit des Gefühlslebens," 1918. Also, "Ueber psychische Ganzheit," 1926.

[8] Krueger, Felix: "The Essence of Feeling," p. 70.

[9] *Conf.*, George M. Stratton: "Excitement as an undifferentiated emotion." Wittenberg Symposium, 1927. Also James' account of his own feelings during directed thinking. "Principles of Psychology," v. 2, p. 472.

thoughts. Rather it would seem to be related to directed thinking considered as a whole process or pattern activity and without reference to the constantly shifting ideas, conscious attitudes, awareness of relationships, etc., which are included in thinking. This particular type of thinking, *i. e.*, directed, or "goal" thinking, is accompanied as we have seen, by certain qualities of tension, of alertness, of "undifferentiated excitement"; mood qualities which inhere in the process by virtue of the fact that we are dealing with massive attitudinal sets or configuring modes of consciousness. Moreover in our patients "without feelings" who complain of an inability to concentrate, these whole properties are missing. With them, however, the individual "elements" of thought are intact. Moreover the specific feeling [10] which has been described in connection with these part components—ideas, judgments, awareness of relationships and the rest of the machinery of intellection—is intact and perfectly normal. Thus we are led to the suspicion that only certain whole properties are affected by the disease.

Now let us describe a far different form of mental activity, a type of reverie state which is qualitatively a quite different experience. Qualitatively it is much richer, and it will be interesting to see if the same generalizations we have tentatively made concerning the nature of what constitutes the richness of experience, will be valid here.

As we have said this state is emotionally richer than the preceding one and, for the moment, distinctly more pleasant. It is not an undifferentiated feeling but seems intimately related to the environment which obtrudes itself into consciousness like some massive, complex stimulus. In this state I am aware that it is night and that outside it is raining. It would be easy to call all these things stimuli, as well as countless other various noises, sights and smells—the pattering of the rain, the splashing of automobiles, etc., all of which things seem to enter into the experience. Now the mood fringe

[10] Orth, for example, definitely found feeling accompanying some instances of awareness of meaning (Bewusstseinslage). "Zur qualitätiven Untersuchung der Association." Zeit. f. Psych. u. Phys. d. Sinnesorg., 26, 1901, 1 ff., esp. 5 f. Copious instances of "feeling" as applied to the mechanics of thought were found by the pioneers in this subject—Marbe, Mayer, Orth, Ach, Messer and Bühler. The subject, however, bears only indirectly on our problem.

accompanying this reverie state is at once recognized as a familiar one. It is by no means novel. In it the mood component of many similar situations in the past seems to be subsumed. Sometimes the ideational components of these analogously toned situations come up in the form of memories of varying distinctness, *e. g.,* the memory of a shipyard on just such a night many years ago and a great wealth of similarly toned material. More often the ideational, or better, cognitive material of these memory islands lies unobtrusively in the background, the most prominent thing being the mood sign, or tonal tag which attaches to the whole giving to the memory complex a sort of organized, coherent unity. Moreover, these similarly toned memory islands form a sort of historical chain stretching way back through the years. As stated above, it is the characteristic mood component which I subsume in these memory groups, the cognitive elements being much less obtrusive. These memory islands, similarly toned from the standpoint of mood, would seem to conveniently form a series which for my own personal convenience, for example, I might call " the rainy night series." Nor is this series with its characteristic " flavor " the only one in my possession. Fortunately I have a number of them, so that from the mood standpoint, such a rainy night can be constellated in many different ways —now being brought into line with one series, now another, always with a characteristic emotional change as the mood components of the different series are subsumed. It is noteworthy that the same cognitive material—the same fragments of scenes and memories—may appear in more than one series, the identical material being built into different mood fabrics.

There is thus produced what might be called a " mood orientation " in which the perceived locale is given body or feeling qualities by virtue of its constellation or grouping with similarly toned past experiences. These subsumed locale qualities are distinctly emotional and altogether different from the mere cognitive awareness of locale which is nothing more than orientation for place. To " know " and recognize a place is something quite different from being able to subsume those locale qualities which endow the place with richness and interest.

Now to return to our patients " without feelings " we find that they are unhappy no matter where they are. Old and familiar scenes as well as new ones, the beauties of nature, even home leave

these patients absolutely cold. As a matter of fact they purposely avoid just those places and former interests which were the most heavily charged with affect. This trait is particularly interesting from the gestalt standpoint and suggests some failure at gap closing.

Finally in the qualitative aspects of this reverie state we make another important discovery which seems to be true of all mood fringes. It would seem that the mood that has been described is not based on isolated rain, nor isolated sound of wheels etc., nor on any arithmetical summation of these purely sensory elements. It would seem that it is not the single sensory components, but the total milieu which is mood provoking. The emotion seems to spread over the whole memory-perceptive complex; it seems to be an organic, integral part of it. We cannot conceive of the resultant mood being "built up" by the mere adding together of this vast mass of sensory components, constantly changing and reappearing in other totally different memory series. And yet the resulting mood is felt by us as "einfach," or as simple and unanalysable as any single sensation.[11]

We must consider the origin of these mood shapes as problematical in the highest degree. To take the simplest case, what could be the origin of the types of locale feeling we have just been considering? We have already mentioned the importance of subsumption here but obviously not all locale qualities can be accounted for by reference to similarly toned past experiences. There must have been a beginning somewhere. We are forced to the conclusion that in some way they are inherently bound up in the act of perceiving locale, *i. e.*, in the perception of extensive, coherent masses of place stimuli. In this they resemble other gestalt qualities similarly bound up in the perception of fairly discrete objects viz. such qualities as the objectivity of things, constancy of shape and motion, etc. Even in these simpler instances, we must consider the problem of origin as still unsolved. Why, for example, are things seen as complete coherent configurations? Köehler thought he had found the solution in an appeal to physical analogies, but despite the ingenuity of his arguments, many remain still unconvinced.[12] The psycho-

[11] Compare Wundt's doctrine of the Totalgefühl; Grundriss, 1896, p. 188 and elsewhere.

[12] Koehler, Wolfgang: "Die physischen Gestalten in Ruhe und im stationären Zustand," 1920.

physics of locale perception would be still more problematical, involving as it does, a still greater complexity of moments both objective and interpersonal.

The question also comes up as to the importance of interpersonal forces in the origin and "shaping" of these feeling qualities. (Our silence on the subject so far is possibly a "reaction formation" against the almost exclusively interpersonal bias of modern psychopathology. For example, there can be no doubt that much of the qualitative richness of these locale feelings can be traced back to successful or unsuccessful interpersonal contacts—either actual or expectant. We can do no more than point out the connection without any attempt at explanation. It is obvious that we avoid the places where we have been humbled and humiliated, that we cherish others where we have received love and esteem. Here introspection will show that the locale qualities thus produced acquire a peculiar, characteristic flavor which at least consciously is not connected with the actual memories of the involved interpersonal contacts. No explanation can be ventured, but it is our guess that it is the "Stimmung," the pleasant or unpleasant thalamo-splanchnic effects produced by the interpersonal contact which sensitizes us, something in the manner of a photographic plate, to the impinging locale. At any rate, as a result of interpersonal contacts, we find locale qualities acquiring a peculiar, pleasant or unpleasant individual quality.

Now so far in our attempt to discover those mood qualities which give richness to experience and which are at the root of the symptom of "loss of feelings," we have dealt with only two "states," or ways of being conscious. In both cases, we have discovered something which is characteristically missing in the morbid symptom under consideration and which we have called the mood fringe. In both cases we saw that the feeling quality was related to these activities only as properties of whole states of consciousness. We have also considered these as global attitudes, or massive organized "sets" of the central nervous system. But there are many other "sets," or organized patterns of response; play, conversation, phantasy states and a host of others. Their enumeration and study would lead us far afield. In all of these, normally, there inhere feeling tones which are properties of the whole response just as in the two types studied above. In the symptom of "loss of feelings" it is

precisely some of these whole properties which are missing, with the result that consciousness degenerates into a pale, empty, cognitive awareness. Thus the "feelinglessness" of these patients is found to be due largely to an inability to experience a particular type of feeling, or sounding board quality which normally is correlated with certain whole processes. The peculiar sort of feeling defect shown by these patients thus becomes intelligible to us only when approached from a configurative standpoint. Even thinking, *i. e.*, directed, concentrated thinking, we have seen was impossible in severe cases possibly because of the absence of the alertness, the "undifferentiated excitement," which as a whole property, would seem to betoken the erection of what might be called the thinking pattern.[13]

The feeling phenomena we have been describing belong to the most intimate and personal aspects of mental life. We feel that these mood fringes are peculiarly our own personal property, that no one could experience them quite like ourselves. My neighbor and I may be both looking at the same object, we both of us identify, name and describe it. But the particular way in which I see it, I sense as a personal, incommunicable experience. It is here in these mood fringes that the "this-is-mine-ness" (Ichbestimmtheit)[14] of experience is peculiarly felt. The peculiarly personal quality of feeling has often been dwelt upon. Lipps, for instance, considered the feelings as modes of reference to the self; feelings were "Ichinhalte" or "Ichqualitäten."[15]

This suggests another property of the mood-fringe—the lack of clearness. This is a general property of all feelings. They do not occupy the focal point of consciousness. Using an analogy, they are extramacular. But this does not mean that feelings are of less importance; it only means that being less clear they are less easily handled and attended to, than, *e. g.*, perception or memory.[16] As

[13] Let us contrast again the "rigid" melancholic with his constant depressive thought stream related no doubt to moods or whole qualities inhering in these various "worrying" states.

[14] Jaspers, Karl: *Ibid.*, p. 77 (with special reference to Geiger and Lipps).

[15] *Conf.*, T. Lipps: "Das Selbstbewusstsein, Empfindung und Gefühl," 1901, p. 14.

[16] Again one is reminded of Brentano's distinction between act awareness and object awareness. E. g., I am aware of the act of thinking no matter

we have pointed out, these feelings are circumambient and embrace and penetrate the whole field of consciousness, no matter what other more "central" psychisms or part activities are taking place.

The treatment of these feeling phenomena as gestalt properties will no doubt meet with some criticism. In the first place we have seen that they are not constant configurative properties in the same sense as the objectivity of things, localization of weights, constancy of size, form, speed, etc.[17] A certain mood, for example, may or may not appear, but it is not an essential, integral part of its ideational component, such as, for example, the objectivity and constancy of shape of the piece of paper before me. That the mood component may be detached, we have seen in the symptom of "loss of feelings"; that it may not only be detached but forever lost, is a natural, "physiological" process attending the ageing of our own sounding boards.[18] But that these feelings under consideration are at least gestalt-like, we insist for the reason that while they have the nature of whole qualities, (*conf.*, the von Ehrenfels qualities described above) they are also simple and subjectively unanalysable. And now we come to the paradox shown by these patients who are so indescribably miserable amid their loss of feeling. In terms of configurative psychology, the peculiar discomfort of moodlessness, assuming that the mood is normally an integral part of a configurated experience, would be traceable to a failure at gap closing.

Now in treating these mood components as gestalt properties, we can fall into two theoretical extremes. On the one hand we can adopt a rigorously orthodox gestalt orientation (in the sense of the Wertheimer-Koffka-Köhler school) and throw back the psychody-

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how the content of thought, the thought stuff, is varied. The functioning of these activities is not made known cognitively but is felt. We seem to be aware of the mood fringe in much the same, indirect fashion. *Conf.* E. B. Titchener: "Lectures on the Experimental Psychology of the Thought Processes." Chap. 4. For lack of clearness as a criterion of all affection, conf. by the same author: "The Psychology of Feeling and Attention," pp. 69, 77, 180, 334.

[17] Köehler, Wolfgang: "Gestalt Psychology." Chap. 6.

[18] Not in the sense that James gives to the term sounding board with reference to his special theory of the emotions. Cannon's work with the simple emotions may reveal the true basis of these feeling phenomena as massive thalamo-splanchnic patterns. *Conf.*, Cannon, W. B. "Against the James-Lange Theory of Emotion." Psych. Rev., 1931, pp. 28-295.

namic process directly upon the perceived material (or ideational component) thus putting these processes in the same category as constancy of form, motion, etc. The other extreme would lay the stress on the perceiving self. This would be the attitudinal approach. It would throw the gestalt phenomena further back, upon processes of attitude, whole processes involving extensive portions of the personality acting as coherent, dynamically self distributed, organic wholes.[19] This would answer the criticism which has been directed against Gestalt psychology as a line of reasoning " from without inwards " and which would also answer the charge of naive realism and the alleged elevation of the gestalten to the level of autochthonous, ontological realities.[20]

To summarise briefly, the symptom complex of " loss of feelings " has discovered for us a new qualitative dimension in consciousness, which we have referred to as *richness-flatness*. It seems to be based upon the fact that the mind, like a musical instrument, has what might be called a timber of its own, a constant accompaniment of feeling of extreme complexity and richness. We have witnessed the failure of the ancient pain-pleasure yardstick in measuring this complexity. And so, of clinical necessity, we have been led to the study of the qualitatively " rich " in mental life. This richness we have found to be intelligible only when we adopted a configural point of view; the essentially gestalt-like nature of these mood fringes would otherwise have eluded us. " Loss of feelings " as a morbid symptom is thus explained as a sudden and massive dropping out of these mood shapes.

In conclusion we may ask ourselves the question whether or not " loss of feelings " does not have some analogy in normal life. Where the loss is sudden and massive we have the clinical picture described above. However, it is our belief that a certain " functional " loss is constantly going on in all individuals. What adult, for example, can still view the world through the eyes of his childhood? Cognitively it is the same world, but how vastly altered

[19] This would include Köhler's later doctrine of ego attitudes; also the doctrine of psychodispositional continuous forms. *Conf.*, F. Sander: "Structure, Totality of Experience and Gestalt." Psychologies of 1930. Clark University Press.

[20] Peterman, Bruno: " The Gestalt Theory and the Problem of Configuration." 1932, pp. 298-304.

emotionally! It is largely upon this basis that Bleuler explains the profound amnesia for the events of early childhood; upon the basis of a consciousness profoundly altered-psychisms radically altered in their feeling quality and hence no longer ekphorizable.[21] Man lives in a world which he is constantly " reshaping " from the mood standpoint. This seems to go hand in hand with the natural, physiological ageing of his own sounding board. The poet Goldsmith in his " Deserted Village " stands aghast at a ruin which was entirely within himself. The theme is recurrent in the poetry of all ages. The poet revisiting the scenes of his childhood sees nothing but ruin and desolation. For the moment he is " moodless " in the sense we have described. But unlike our sick patients, he is not altogether and completely so. As the adult gradually embarks upon a life of reason and achievement his mental life also changes qualitatively. Old mood shapes are constantly giving place to new. For the passing of the former at first a few wistful regrets, then they are gone forever. Normally this change in feeling response is so slow as to escape notice. At the same time, in the passage from childhood to old age, " new interests " arise, which is another way of saying that life becomes reshaped or reconstellated from the standpoint of mood.

[21] Bleuler, E.: " Textbook of Psychiatry." 1924, p. 103.

ALCOHOL INJECTED INTRAVENOUSLY.

Some Psychological and Psychopathological Effects in Man.*

By HENRY W. NEWMAN, M.D.

There has recently been a revival of interest in the psychological effects of various intoxicating drugs, based on the newer concept of psychopathological processes in the dynamic sense. The effectiveness of sodium amytal in establishing rapport with inaccessible patients, noted no doubt by many observers, has been reported at some length.[1] More recently Lindemann and Malamud [2] have reported their experiences with four drugs, sodium amytal, mescaline, cocaine and hasheesh, all of which were administered serially to a small group of patients, including psychoneurotics and schizophrenics. They found an interesting variation in effect, not alone of the various agents, but of the same agent in individuals of varying reaction types.

Of the drugs employed by man for their psychological effect, ethyl alcohol is certainly the most ancient and has enjoyed the most widespread popularity. For this reason it has seemed to us that an investigation of the effects of this agent, if carried out under well-controlled conditions, would be of even greater interest than the knowledge of those agents which have but recently invaded man's environment.

The antiquity of the use of alcohol as a beverage needs no comment; yet, to the present time, there is no entirely satisfactory explanation of its mode of action. True, the concept of alcohol as a stimulant has been largely replaced by the newer idea that its action is almost always that of a depressant, but whether this is universally applicable or not is still controversial.

Research into the psychological effect of any agent must choose either of two avenues which at the present time are quite divergent.

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One may elect to investigate a single phase of human or animal behavior, in which case it is possible in many instances to employ precise and objective measurements of the phenomenon in question. The excellent work of Miles [3] on alcohol is an example of this approach to the problem. Here we have the opportunity of collecting data capable of statistical analysis, yet the results scarcely give us an adequate idea of the reaction of the organism as a whole to the intoxicant. On the other hand, one may attempt through a more subjective approach to gain an appreciation of the reaction of the total individual to the agent. Obviously, both methods are open to criticism, yet both are necessary to a full appreciation of the problem. In the present work we have chosen the subjective evaluation of the reaction of the individual as a whole to the presence of a fairly constant concentration of alcohol.

Any investigation of the effect of alcohol presents an additional difficulty that is not present with agents which are not familiar to the subject, or which can be easily and effectively disguised. Since the behavior of the inebriate is familiar to everyone, if not from actual experience, then from its popularization by the cinema, it is reasonable to expect that the reaction of an individual to alcohol administered with this knowledge would be a combination of the action of the drug itself and of the subject's interpretation of the action of alcohol, based on his personal and vicarious experience.

There have been attempts without end to disguise the alcoholic beverage so that the subject would not be aware of its identity, but in no case have the experimenters been entirely satisfied with the expedient. Nor is the use of a stomach tube effective, as the feeling of warmth and the characteristic eructations are all too revealing.

The recent use of alcohol by parenteral injection, both as a general anesthetic [4] and against infection,[5] has opened a new avenue of approach to this problem. Of the various parenteral routes, the intravenous has the advantage of the greatest practicability. It has been employed in a sufficiently large group of patients to prove it free from significant ill effects.

The possible psychological effect of the administration of a considerable volume of fluid by vein can be quite adequately subjected to control by administration of a similar injection of normal saline solution. In our experience this procedure produced none of the

changes noted when alcohol was given, and we can say with some conviction that the reaction arising from the injection itself is negligible as compared with that resulting from the passage of a stomach tube or the ingestion of a large quantity of unpalatable beverage.

It must be admitted that in the case of certain intelligent individuals chronically addicted to the excessive consumption of alcohol the identity of the injected fluid was suspected, but in no case with any degree of conviction on the part of the subject. Occasionally the subject said he felt as if he were drunk, and asked if there was any alcohol in the fluid. However, in better than half of the cases there was no suspicion on the part of the subject that alcohol was being given, which should make it possible in these instances to determine the physiological and psychological effects of alcohol without the complicating factors engendered by the knowledge that alcohol is being taken.

The ability to control the alcohol content of the blood stream accurately and promptly is another advantage of the intravenous route which finds its application to a number of problems, some of which have already been investigated by this method.[6] The factor of absorption from the gastrointestinal tract is completely eliminated.

Method.

In the investigation of the psychological effect of alcohol we have adhered to a uniform technic of administration, which has been evolved through experience with a considerable number of alcoholic injections prior to the start of the present work. The solution employed consisted of 10 per cent by volume of 95 per cent ethyl alcohol in a physiological solution of sodium chloride. Previous experience had shown that a dose proportional to body surface gave a more uniform alcohol concentration than one with either weight or height alone as its basis. The dosage was thus calculated from the DuBois chart, allowing 40 cc. of 95 per cent alcohol per square meter of surface area, or 400 cc. of the diluted alcohol. In an individual of normal build this amounts to approximately 1 cc. of absolute alcohol per kilogram of body weight, or a quarter pint of 100 proof spiritus frumenti. This is about one-third of the dosage required for anesthesia in man. While effective in producing definite and appreciable changes in reaction in most individuals, it partakes

of none of the dangers incidental to the administration of anesthetic doses.

The rate of injection, which was by gravity, was so adjusted that each injection occupied one hour. The average maximum attained by the alcohol in the blood stream was 112 mgm. per hundred cc. Chart 1 shows how close the course of blood alcohol after this procedure follows that after ingestion of a similar dose by mouth. Thus

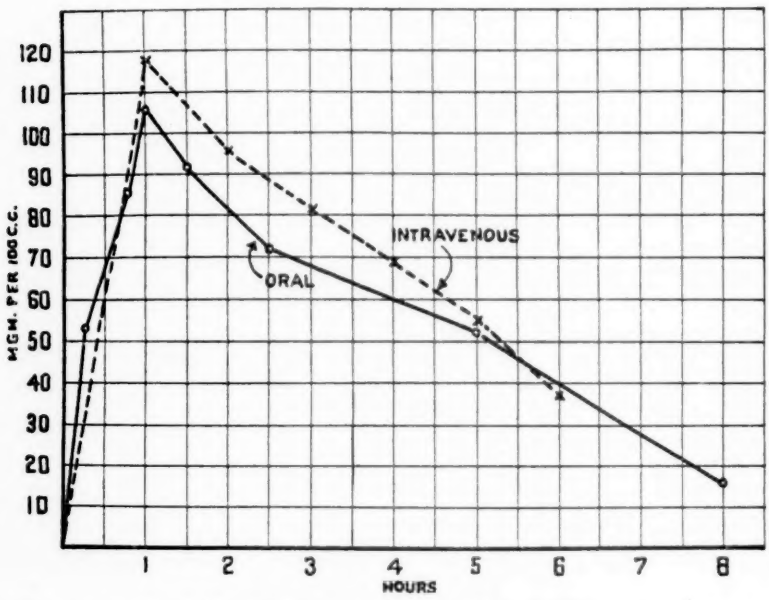

CHART 1.—Alcoholic Content of the Blood Following Intravenous and Oral Administration of Alcohol.

the rise and fall of the alcohol in the blood in our cases follows a course exactly similar to that encountered in individuals who have partaken of alcohol in the more orthodox manner.

MATERIAL.

The subjects for the experimentation were chosen indiscriminately from the patients entering the clinic ward devoted to diagnosis and treatment of organic and functional diseases of the nervous system, excluding for obvious reasons those patients with

advanced cardiac or renal lesions. It was also found inexpedient to subject markedly disturbed patients to the procedure. Epileptics were not excepted, and despite the fact that alcohol is generally considered taboo in this condition no attacks were produced.

In order that the series may be large enough to warrant drawing some conclusions from them, we will concern ourselves in this analysis with but three groups; normals, psychoneurotics, and schizophrenics, comprising 50 patients in all.

Normal Group.

Nine patients suffering from organic disease of the central nervous system will be considered as essentially normal, an assumption that is justified at least so far as overt divergence from the normal reaction pattern is concerned. For want of better material this must constitute our normal group. They showed a rather constant reaction to alcohol, varying in a quantitative rather than a qualitative sense. All of them exhibited increased rapport with the physician, although it was usually the first interview. This was limited, however, to an increased willingness to discuss problems of the illness and a feeling of confidence in the doctor's ability to effect a cure, and did not partake of the extravagances of demonstrativeness shown by certain of the psychoneurotic group. A third of them evidenced an increased feeling of well-being which verged on euphoria, while none became sufficiently depressed to cry. All showed an increased loquacity, yet only one showed a tendency to elaborate on his symptoms; rather, the conversation turned to topics of general interest. Some individuals showed an increased vivacity, most of them talked more freely and extensively, and many showed a slight slurring of speech, but there was a complete absence of aggressiveness and pugnacity, which may indeed be said of the whole series. Although drowsiness was present in most cases to some degree, there was no evidence of loss of contact with reality.

Psychoneurotic Group.

The patients suffering from the psychoneuroses behaved in the main in a more exaggerated manner. The excellent rapport with the operator, met with universally in the normal group, was absent in a third of the 32 subjects, but when present was often very marked,

being accompanied by such tangible signs of affection as to leave no doubt of the nature of the attachment. Three-quarters of the subjects became more communicative, while in the remainder an increase in symptoms, at times actively suggested by the physician for diagnostic reasons, precluded any increase in conversation. Emotional instability was more marked than in the normals, a quarter of the patients becoming euphoric, while a third gave way to tears. Almost half of the subjects showed a tendency to exaggerate their symptoms, with the result that in several cases it was possible by suggestion to induce hysterical seizures. The following case history illustrates this point:

Mrs. G. B., a 42-year-old American telegrapher, entered the hospital with the complaint of difficulty in breathing for a year and a half, with three serious attacks in the month before entry that had necessitated her leaving her employment. She had recently experienced financial reverses, and shortly before the onset of her present illness had been forced to give up her home and move to less attractive surroundings. She described her attacks as being ushered in by hyperpnea, followed by numbness and tingling in her hands and feet, after which she would lapse into unconsciousness for a short time. Physical and laboratory examinations revealed nothing abnormal, nor was she able to demonstrate one of her attacks, although encouraged to do so. During the injection of alcohol by vein she showed a slight increase in conversation at first. Soon she became less communicative, and tears began to roll down her cheeks. Toward the end of the injection it was forcibly suggested to her that the procedure would probably cause one of her attacks. She promptly proceeded to overbreath, rocked her head violently from side to side and lapsed into a stupor from which she could not be aroused. Her hands and feet showed the typical tetanic position. This continued for some 30 minutes, after which she slowly returned to normal.

The increased suggestibility of this patient under alcohol was striking, with the production of an hysterical seizure which quite obviously was tetany induced by hyperventilation. In this case it was of considerable value to us to have seen one of the attacks, as it removed all doubt as to the diagnosis.

Schizophrenic Group.

Of the 9 patients included in the schizophrenic group, 3 were cases of some standing, while in the other 6 the classification was not made prior to the hospital entry during which the injections were given.

In contrast to the normals and psychoneurotics, these individuals showed no tendency to become increasingly friendly with the physician who administered the alcohol; in fact, as a rule the opposite was true. Nor did but one show any increased communicativeness. Emotional instability was evident, almost half the subjects crying, generally without any other manifestation of depression. None of them showed any hint of euphoria. Most marked was an augmentation of the loss of contact with reality exhibited by all these patients, as evidenced by more frank hallucinations and delusional ideas, and in one case the development of a catatonic state. It must be remembered that most of these patients were in the incipiency of the disease, with a fair ability to cover up their symptoms, so that in a number of them it was only after the administration of alcohol that this superficial ability for adjustment dropped away to reveal the true mental state. The following is a case in point:

Miss E. P., a 20-year-old American governess, was brought to the hospital because she had been in a mild depression for the preceding six months. She was a pampered youngest child whose childhood seemed normal, although she had few friends outside of the family. Because of financial reverses suffered by her family she found it necessary to become a governess. She soon grew to resent being considered a servant, left her position, and soon became quite depressed. She cried at the slightest provocation, and took no interest in her surroundings. She preferred to remain by herself and appeared to day-dream, although she would admit no delusions or hallucinations. On the administration of alcohol, she began to laugh in a silly manner, and would not reply to questions. She vomited copiously, not an unusual phenomenon following the procedure. A typical catatonic stupor then developed. She refused to walk or cooperate in any way. At no time did she show any rapport with the operator, being rather oblivious of everything but her own thoughts.

In this case the development of the catatonic reaction was of considerable value in establishing the diagnosis, which had previously been in question.

Comment.

It is of interest to note the differences in the effect of alcohol administered in the manner described, and that usually ascribed to the drug. These differences may be accounted for by two factors; first, the environment differed markedly from that in which spirituous beverages are ordinarily ingested, and second, the ignorance

of having taken alcohol removed the element of suggestion which might play a large rôle in determining the behavior. Only very occasionally would the actions of the subject have been construed as those of an inebriate by a casual observer.

In the majority of instances, the alcohol was effective in breaking through the subject's reserve, but rarely changed to any marked degree the affective tone manifested prior to the injection. Since in our series, composed of psychoneurotics in the majority, this was generally one of depression or anxiety, it is not remarkable that the incidence of crying was higher than one would expect in a group of normal people taking alcohol by mouth at a social function.

The reputation of alcohol for breaking down inhibitions was confirmed by the increased willingness of most of the patients to divulge the more intimate details of their histories. An abandoning

CHART 2.

AN ANALYSIS OF THE EFFECTS OF ALCOHOL INJECTED INTRAVENOUSLY.

	Normal.	Psychoneurotic.	Schizophrenic.
	9	32	9
Improved Rapport	100%	66%	11%
Increased Volubility	100%	78%	0%
Euphoria	33%	25%	0%
Depression, Crying	0%	34%	44%
Exaggeration of Symptoms	11%	41%	33%
Loss of Contact with Reality	0%	3%	100%

of affectations of speech and manner was also noted. The mechanism of the mental illness frequently became more manifest in the attitude of the patient to his environment; the dissatisfactions that he felt previously to be in bad taste or to reflect no glory on himself becoming increasingly evident as the critical faculty became depressed by alcohol.

Although the small size of our series precludes any authoritative deductions regarding the difference in the effect of alcohol in the various reaction types, certain very definite tendencies seem to be apparent, as can be seen from the analysis presented in Chart 2. In contrast to the increased volubility, improved rapport, and exaggeration of symptoms on the part of the psychoneurotic, is the

antagonism, increased dissociation, and even catatonia of the schizophrenic. Here it seems that the effect of the drug is to effect a quantitative rather than a qualitative change in behavior, accentuating the fundamental reaction type of the individual. By so doing, in some cases the classification of the mental illness is facilitated, an end to be desired. Unfortunately lack of suitable material and technical difficulties have prevented us from securing sufficient data regarding the cyclothymics for presentation at this time.

Whether or not the intravenous administration of alcohol proves of definite value in the diagnosis of certain types of mental disease, we have in this procedure a method whereby the effect of alcohol on man may be divorced from the complicating factor of suggestion which has made the evaluation of the results of experimentation so difficult.

Summary and Conclusions.

In the majority of cases, the administration of ethyl alcohol as a 10 per cent solution intravenously may be accomplished without the subject realizing that he is receiving alcohol. This is of paramount importance in any investigation of the effects of alcohol in man.

By the use of this method, it has been shown that the response to moderate doses of alcohol in normal individuals consists of an increased freedom of conversation, an intensification of the previously existing mood, and a tendency to drowsiness. The psychoneurotic group showed an exaggerated garrulity, a tendency to excessive emotional outbursts, and a multiplication of symptoms. Many showed improved rapport with the physician, and were rendered more accessible to psychotherapy, especially direct suggestion. The schizophrenic group, on the contrary, retired further from reality, becoming antagonistic, mute, and negativistic in varying degree.

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PSYCHOTHERAPY IN STATE HOSPITALS.*

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When your distinguished president suggested that I present a paper at this meeting I was greatly inclined to beg release from this particular part of a member's obligations to the Society. Finally, however, it occurred to me that I might break ground for the discussion of a subject which I believe has not received special consideration by the Society, at least during recent years.

The modern hospital for mental diseases not only treats any physical disease from which the patient may suffer but makes use of an extensive armamentarium of valuable therapeutic measures particularly adapted for psychiatric treatment, viz., hydrotherapy, occupational therapy, physiotherapy, entertainments, recreational activities and various other means aimed to promote tranquillity of mind and socialization of interests. Except for the subtle healing influences of a salutary institutional regimen and of nature herself these measures must in most cases constitute the principal and, in many cases, the only therapeutic resource of the psychiatrist. It has seemed to me that in one respect, however, institutional practice of psychiatry has lagged behind private practice in the treatment of mental disorder. Of course conditions as presented in the type of patient and in the modifiability of his disease by treatment are far different in the two forms of practice. Private practice with its preponderance of neuroses and paucity of major psychoses offers an immensely greater opportunity for psychotherapy than does institutional practice with its contrasting distribution in type of case. Is it not true, nevertheless, that in the small number of institutional patients who may be helped by psychotherapy this form of treatment has never been given the trial which has been granted to other less time-consuming and more objective and impersonal types of therapy?

* Read at the semi-annual meeting of the New England Society of Psychiatry, October 10, 1934.

One's views as to the applicability of psychotherapy will in part be determined by his conceptions as to the fundamental nature of mind and as to the causes and nature of mental disease. May I therefore be pardoned if I depart for a moment from the subject indicated by the title of the paper in order to discuss briefly certain concepts the acceptance or rejection of which must influence one's ideas as to the nature of mental disorder and to some degree the type of technique he would employ in its treatment.

There seems to be every reason to believe that man is the culmination of a continuous, ascending evolutionary series of animal life and that as an organism in this series the biological principles of his behavior will be fundamentally the same as those that obtain in lower members of the scale. The sum total of the organism's reactions to the various pressures and stimuli without and to the drives and processes within constitute a unitary response of the organism known as the mind which has existed from the earliest, simplest form of animal life and has passed through the same evolutionary series as has the structural aspect of the organism. In the case of an animal of one cell we can readily understand that any activity or response must be a unitary one, the resultant of all the reacting tendencies within it, an expression of the organism as a whole. In this unicellular animal its structure and the very simple responses and expressions constituting a most rudimentary mind will rather plainly be but different aspects of a unitary organism and this rudimentary mind will be the expression of the organism in its totality. Although an idea that is less easily followed the application of the same biological principles means that the multicellular animal functions in each act as unifiedly as does the animal of one cell. The body of a multicellular animal is made up of many parts and organs, yet by means of the nervous system these organs and their functions are integrated, or all made to work together and constructed into a unity of structure and function which expresses itself as a whole and not as the algebraic sum of an arm, a leg and a liver. Each act is the resultant of the forces operating in and upon the organism. Each instance, then, of man's behavior will be that of an organism as a whole, and mind will be the biological expression and behavior of the organism responding to its own needs and to the stresses of its environment.

In this introductory and somewhat irrelevant discussion I have endeavored to provide a perspective in which all mental phenomena,

whether we call them normal or psychotic, will be seen as the biological reaction and expression of the human organism responding as a behaving and performing unit to the sum of its life conditions. Since such total biological responses of an organism are mental in nature they may be spoken of as psychobiological.

The elements in the life conditions to which psychobiological reactions occur are most numerous and varied and may be favorable or noxious. When these psychobiological responses to life conditions are too highly individualized and socially disserviceable they are called psychotic. In many instances degenerative processes incident to vascular disease or senile devolution, or destructive ones due to an invasion by microparasites so impair the great integrating mechanism, the nervous system, that deficient, defective responses of the organism result. Because organic factors play an important rôle in this group it does not come within the scope of this paper although psychological elements may influence pathoplastically the symptoms presented.

In a still larger group of psychoses we deal with psychobiological reactions with which we cannot yet associate any structural or biochemical changes that can be accepted as constant or characteristic. It would appear that these reactions are determined by various factors, all of which, however, are highly individual in nature. Their diagnoses, therefore, should be expressed in terms of individual situations and problems and the special methods employed in dealing with them. In some cases, to be sure, constitutional factors, *i. e.*, the psycho-physical formula of organization of the patient, color any psychotic reactions and probably under conditions of stress tend to release them. In other cases the psychosis represents the progressive development of faulty psychobiological habits to a degree that destroys social adjustment. Such habits may have developed insidiously in response to personality needs, or probably at times because of unwholesome influences in childhood. In a large and, for purposes of our present discussion, an important group of psychoses, the mental disorder is the outcome of more or less obscurely acting psychological influences. Occasionally, but much less frequently than in the psychoneuroses, the symptoms of these disorders clearly disclose the particular nature of these psychological influences and the manner in which they have operated. In this group we may detect the patient's reactions to experiences of his

inner life. The psychosis may be found to be the expression of a struggle between impulses and the limitations imposed on them by reality, of a striving for an unattainable sense of security, of an attempt to maintain self-esteem, to deal with an overwhelming sense of guilt or with various other special psychological problems.

A little earlier in this paper I stated that one's views as to the applicability and reasonableness of psychotherapy will be determined by his ideas as to the nature of mind and mental disease. I have, therefore, attempted to develop the thesis that since man is a biologic organism, the phenomena we call mind, whether normal or diseased, are but the psychobiological responses of the individual, that the responses we know as the psychoses are reactions to the stresses of the particular life situation with which the individual may be confronted, that at times certain elements in the situation may be psychological and play a rôle of much importance in these unusual responses. Such a view avoids the neurologizing tendencies that formerly retarded the development of psychiatry, fits behavior into a rational place in the biological scheme of life and recognizes psychological experiences as one of many forms of valid scientific facts.

One's views as to psychotherapy will vary, too, according as he prefers to regard mental disorder as a disease entity or as an unsuccessful attempt to solve life problems through psychological mechanisms. The latter concept seems more productive, and since at times the processes in these mechanisms are so manifest as to be almost transparent one is forced to wonder if similar mechanisms are not obscurely operating to produce those reactions that still remain apparently unintelligible.

If one accepts the view that psychological forces take a considerable or significant part in the production of the disturbed psychobiological reactions that lack associated structural or biochemical pathology he is perhaps logically led to assume that an important method in the treatment of such cases would be one involving psychologic technique. The fact, however, that psychologic theory has far outrun its practical application to the therapy of mental disease is one that we must admit. It is equally true, I believe, that a psychotherapy utilizing a knowledge of the commoner mental mechanisms and of the life situations and experiences of the individual patient has never been as extensively applied in institu-

tional practice as it deserves. Psychotherapy in institutions for the psychotic is, of course, nothing new. It has perhaps been employed most extensively and intensively in a few privately endowed institutions. My own feeling, however, is that in them there has at times been a tendency to employ a somewhat restricted, esoteric form of psychotherapy.

Coming to some of the more practical aspects of the subject there arise such questions as the type of patient with whom psychotherapy may be employed, the qualifications and selection of a therapist, the type of therapy to be employed and the results to be expected. In selecting patients for psychotherapy one must keep rather distinctly in mind the objectives to be sought in the individual case and the limitations of psychotherapy as a method of treatment. There is a rather large group of patients whose institutional residence will be made more comfortable by an opportunity to discuss with a physician many of the disturbing experiences incident to the highly artificial mode of life existing in an institution. The therapist can do much, particularly in the early days of their hospital residence, to interpret the spirit of the institution to members of this group and can serve as counsellor in many of the troubles, subjective and environmental, real and delusional, from which the patient suffers. There is another group of patients who will never recover in any psychological sense but who with psychiatric advice and support will be able to maintain behavior sufficiently socialized that they will be tolerated in the community for varying periods of time. The tolerant and friendly atmosphere of the institution, its tranquilizing and methodical regimen and the opportunity to pour out their troubles to the attentive and considerate ear of the physician serve as simple but effective therapeutic agents for many patients and enable them to maintain considerable periods of tolerable adaptation. Here are to be included some schizophrenic and a few paranoid reactions. There is a third and much smaller group of patients with whom psychotherapy will prove to be the most effective of all types of treatment. In a few cases it may well constitute the only active type of therapy but in more instances should be supplemented by other forms of treatment. In still other cases it is applicable in certain stages only of the psychosis, particularly in convalescence.

The selection of patients for psychotherapy must be on a purely individual basis and carefully determined only after the therapist

has a fair working knowledge of the probable psychopathology of the case and some knowledge of the patient's personality assets. It scarcely needs to be said that psychotherapy must be confined to those with whom it is possible to establish rapport since this relationship is the *sine qua non* for any form of psychotherapy. Probably the most favorable types of cases for psychotherapy in public hospitals are the simple depressions and the situational psychoses. The greater the constitutional element and the more obscure any psychogenic factors the less amenable the case. In the simple depressions and the situational psychoses psychotherapy may be begun without waiting for any spontaneous improvement. Rapport is usually possible from the first or, at least, can be established if the therapist is resourceful. Unfortunately most schizophrenics have really been ill for a long time before they reach the state hospital. A very few, however, come early and appear to be benefited by a discussion of their symptoms and problems in non-technical terms. Occasionally with the appearance of convalescence after a rather stormy catatonic or panic episode a schizophrenic will with the aid of psychotherapy acquire an insight that appears to be of assistance in preventing further attacks. Schizophrenics who have a decided ruminative tendency, who have a well developed paranoid system or who express their psychological problems in terms of somatic distress should rarely be selected for any prolonged psychotherapy. Psychotherapeutic discussion during convalescence seems to be of value in selected cases of manic-depressive psychosis where the constitutional element is not too important. Most cases of psychoneuroses who enter the state hospitals are of such an extreme form that the success secured in private practice with this type of therapy is rarely observed in state hospital work. Occasionally, however, some success follows. Unfortunately psychotherapy with psychotic persons, especially with schizophrenics and with manics, appears at times to have been ill advised since every state hospital physician occasionally sees patients who have acquired a wealth of technical psychiatric terms which they delight in exhibiting but who have not acquired any sound adaptive philosophy of life—they have acquired a vocabulary but not self-knowledge.

Conceding that psychotherapy is one of the methods of treatment to be employed in the state hospital in carefully selected cases

various questions arise, such as whether all ward physicians should devote some time to this work or whether certain physicians should be detailed exclusively to psychotherapy. If all formal psychotherapy is in the hands of special physicians how should they be selected and what should be their qualifications and training? Personally I am convinced that a specially selected physician should be assigned to this work the successful conduct of which requires a pattern of mind and personality frequently not possessed by the ward medical officer. As a rule the physician well qualified for one of these types of medical work is not particularly well adapted to the other. The psychotherapist deals primarily with the individual patient whose happiness and emotional needs are his chief consideration while he fails to see the necessity for many rules and customs essential for institutional operation. On the other hand the ward physician resents any special departures from his standardized ward practice and may look upon the psychotherapist as an impractical visionary lacking in sound judgment. Before undertaking this special branch of psychiatry one should have had at least two years' experience with the psychotic, should have an intuitive mind, an extensive knowledge of psychopathological principles, an apprehension of the modes in which the total psychobiological organism works and a familiarity with the various schools of psychiatry. The wider his interests and the more firmly integrated his own personality the better. His personality and professional approach must inspire the confidence and respect of the patient. It is unfortunately true that experience in general ward administration does not qualify a physician for psychotherapy and in fact is probably a handicap to the development of the special attitude and insight desirable in such work. Occasionally, one meets with a physician whose previous training has been along administrative lines but who, nevertheless, possesses such versatility in aptitude as readily to develop therapeutic skill. Such a type of physician with previous administrative experience is the one, I believe, who should be selected for psychotherapy. He can so place himself in the position of the patient as to understand his emotional needs and yet can recognize the necessity for prudence, foresight and orderly procedure in hospital administration. If he possesses this rounded experience and comprehensive point of view his contacts with the administrative personnel will be gratifyingly free from discord. From what has been said it must

not be inferred that the attainments of the administrative ward physician are in any way inferior to those of the psychotherapist; in fact the ward physician of sound administrate judgment constitutes the backbone of the institution. All too often the psychotherapist who has never had general ward experience and been charged with administrative responsibility will involve the hospital in some embarrassing respect.

Having indicated certain groups of patients among whom one will discover occasional cases suitable for a remedial and constructive type of psychotherapy, and having pointed out the qualities and training to be sought in a psychotherapist there remain to be considered the nature and technique of the psychotherapy which seems most generally applicable in the psychoses. While there are some types of psychotherapy which, if employed injudiciously, may more readily do harm than do others yet the possibilities of psychic harm are not confined to any type. Kretschmer was undoubtedly correct when he wrote that the supreme principle of psychotherapy is *nihil nocere*—do no harm. He adds: "He who never inflicts psychic injury on his patients is already a good psychotherapist. . . . . We are entitled to destroy the little hopes and self-deceptions which help patients' sufferings better than morphine only when higher interests demand it."

Like the selection of persons for treatment the choice of therapy to be employed must be determined solely by factors peculiar to the individual patient. While there is occasionally a state hospital patient with whom one may employ one of the traditional forms of psychotherapy, such as suggestion either in the waking state or by hypnosis, persuasion along lines laid down by Dubois or psychoanalysis of a more or less orthodox Freudian type, yet such cases are rare and one should in general, I believe, be distinctly eclectic in his choice of therapy and select from the various systems what seems most rational and applicable for the particular patient. Most frequently, probably, this will be what Kirby in his presidential address at the recent meeting of the American Psychiatric Association spoke of as the psychobiological approach which utilizes psychoanalytic principles. Perhaps one might also speak of the method as one of analysis, suggestion and re-education. In using the word analysis in this connection I do not mean psychoanalysis but rather an investigation of the patient's total psychic situation through

anamnesis, scrutiny of the environment, search for significant affective experiences, frustrations, complexes and other psychobiological forces that may have shaped personality reactions and mental mechanisms. In other words one should utilize any or every method fitted to investigate the patient's particular psychic situation and remove the source of the disturbance. Probably one will most frequently begin with mental exploration by conversational methods. In most cases this method combined with suggestion and reeducation will permit as much analysis and reconstruction of personality as is possible or advisable with the state hospital patient. Occasionally word-association tests of Jung, Rohrschach's tests of form-interpretation or even the use of free association may be of assistance in discovering subtle constellations of experience. While Freudian psychoanalysis is undoubtedly a suitable therapy for selected psychoneurotics in private practice it is rarely practicable in the state hospital patient with whom there should usually be no attempt to force an uncovering of the deeper strata of the unconscious. What one aims at in the psychotic patient is an ability to face reality and a return of social capacity. If these objectives be maintained it is not of great importance if a part of the patient's mind remains barricaded off except in so far as it remains a vulnerable spot in the personality structure.

It has already been intimated that there can be no successful psychotherapy in the absence of an affective rapport between patient and physician. In his ability to evoke and utilize this indispensable emotional relationship lies largely the curative secret of the successful therapist. For this reason underlying all psychotherapy must be the physician and the technique of his approach. The mistake must not be made of thinking that the mere giving of advice is psychotherapy. The patient doubtless had no end of that before he came to the hospital. If, too, one makes the mistake of serving as judge he will destroy rapport and therefore his usefulness to the patient. The psychiatrist wishes to discover the facts of development, life experiences, habits and instinctive emotional trends and attitudes which, when completely revealed, will account for the mental disorder and point the way for constructive handling.

The conversational method of personality investigation is of course a time-consuming process but since pathogenic varieties of experience tend to be limited to certain typical constellations one

usually discovers a lead without great difficulty. Frequently the more trivial experiences emerge first but if the various trails are patiently followed up more important causal factors may be discovered and the patient become more and more communicative. So far as possible the patient must of himself discover and elucidate his inner difficulties. There should never be any forcible imposition on him of this or that variety of psychiatric theory nor even one's own pet maxims. At most the therapist may collaborate with the patient in discovering the motivation of ideas, actions and feelings, in throwing light on the various psychic facts, in revealing their meaning and the laws that govern their relationship. Through accustoming the patient to face these facts calmly and objectively a readaptation is facilitated. Although the foregoing are the therapeutic objectives yet one's expectations must be tempered by discretion and it be remembered that only a limited number of patients are capable of understanding and correcting their abnormal manifestations. In spite of the necessity for great caution in any claims as to its value I believe that psychotherapy along the lines indicated has not yet been utilized in state hospitals to the extent it merits. The following statement taken again from Kirby's presidential address indicates, I believe, the place it may occupy in our hospitals: "It forms a solid foundation for constructive advice and guidance for psychotic patients after improvement or recovery; accumulating experience indicates its usefulness in borderland cases, incipient psychoses, in the milder affective disorders and certain types of schizophrenia." The psychotherapist can often, also, be indirectly of assistance to the patient by advising the family how to alleviate the stresses to which he may be particularly exposed or susceptible, and by urging his relatives to cultivate a tolerant and considerate attitude toward the limitations of the patient's personality.

For the past two years at the State Hospital at Howard the time of one physician has been devoted entirely to psychotherapy. Some patients were selected for treatment by the therapist as those apparently favorable chanced to come to her attention. Other cases were referred by the ward physicians. An attempt was made to adapt the therapy to the particular needs of the individual patient. In general it was of the type previously described as psychobiological with utilization of some of the more simple psychoanalytic principles. Influences, situations and experiences which

appeared significant or were affectively loaded were objectively discussed and evaluated. In some instances the word association test of Jung was employed to secure leads as to material in the more superficial strata of the unconscious but at no time was anything approaching orthodox Freudian technique employed. The results varied. Frequently estimates as to the therapeutic value must remain a matter of impression rather than of scientific demonstration or measurement. Where definite improvement has followed the question arises as to whether or not a spontaneous improvement or recovery would not have occurred anyway. With most paranoid and many malignant schizophrenic reactions no lasting improvement took place even though the mechanisms and purpose of the psychosis seemed apparent. Results with simple, non-psychotic behavior problems were not usually encouraging. Considerable benefit seemed to result at times in the case of rather uncomplicated schizophrenic reactions. In several instances a more complete understanding of his problems and an apparently firmer integration of the personality seemed to follow psychotherapeutic discussions initiated during the patient's convalescence. Since psychotherapy is usually supplemented by various other therapeutic measures and influences it is often impossible to decide which of the therapeutic resources should receive the major credit, or even to exclude the possibility that a recovery may not after all have been "spontaneous." On the whole, however, the results have impressed us as well worth while. Entirely apart from our belief that the experiment has by its actual therapeutic results justified the expenditure of public funds for this purpose the intensive psychopathological study of a few cases has tended to keep before the staff the desirability of as thorough a psychiatric investigation of their patients as is possible.

Attention has already been called to the fact that in the event of the patient's recovery there must always remain doubt as to the extent to which psychotherapy has contributed to the favorable outcome. If I may, however, I should like to report briefly one case where it would appear that psychotherapy played an important part. If the results are in any way attributable to the psychotherapist the credit should be given to Dr. Vera Mather, until recently a member of the State Hospital staff and who is unfortu-

nately unable to attend this meeting and present the record of her work.

X, 43, was transferred to the State Hospital April 9, 1931, from a county jail where he was awaiting trial on an indictment charging him with forgery and embezzlement. His parents and siblings were respected, successful persons, one brother being the judge of a minor court. On completing high school the patient entered the employ of a bank as messenger boy. He was promoted from time to time, finally becoming cashier. In 1914 he married. His family life was congenial and he became the father of nine promising children. As subsequently transpired the patient began, probably about 1925, to embezzle bank funds. The use he made of these funds is somewhat uncertain as he did not live extravagantly.

In 1927 and early in 1928 a few brief amnesic episodes occurred. "Sometimes he did not know what was going on," as his wife later described certain episodes at this time. One morning in July, 1928, he went to his garage as usual. The family noted his unusually long absence and on investigation found the garage door closed, the motor of his car still running and the patient partly out of the automobile and in an unconscious state. He remained unconscious from 8 a. m. to 1 p. m. and after regaining consciousness had no recollection of what was undoubtedly a suicidal attempt. He remained in bed during the rest of July, August, September and October. After October he could get about a little but continued to complain of constant headache, appeared bewildered and weak and would stagger as he tried to walk. He was ill-tempered, irritable and on several occasions said he believed he was going to die.

Two months after the asphyxiation episode the patient was informed that an investigation of his accounts had disclosed embezzlement and forgery. The patient still appeared bewildered, at times would not talk, and appeared to have no recollection of incidents in his former business activities. He complained that former business associates were hostile to him. At times he seemed afraid and would say, "Someone is calling me, someone is coming to get me." At times he would cry and scream in great agitation; would say he hoped he would die. During most of this time he lay in bed, depressed, apprehensive, agitated, for the most part inaccessible and with an ice bag to his head which, he said, ached constantly. He became progressively amnesic and in May, 1929, was transferred to a nursing home where he remained constantly in bed. Frequently he would not speak to his wife when she visited him. In the spring of 1929 following his indictment for embezzlement and forgery he was transferred to jail to await trial. We know little of his condition during the next two years except that he showed marked memory loss, bewilderment and withdrawal, was uncommunicative, probably deluded and became progressively weaker physically.

As already stated the patient was transferred to the State Hospital in April, 1931, nearly three years after the suicidal attempt and the immediately subsequent appearance of mental symptoms. On arrival at the hospital the

patient was weak, poorly nourished and walked with unsteady gait. His hair was uncombed, his clothing unkempt, his forehead and wrists exhibited extensive self-inflicted abrasions. His face was deeply lined, his forehead wrinkled and his expression one of anxiety. In the examining room he did not move except occasionally to stare furtively about him. Once when questioned he said: "Don't over—over—overload my mind." He believed he was in a hospital but could not tell whence he came, the date, or give any account of his previous life. He gave his age as 38 whereas he was 43. He could not give his former occupation, had no recollection of his children and was not even sure of his own surname. "Do you know that lady who comes to see me? She is kind and all that but I have an idea she is not my wife." Many times it was necessary to repeat questions several times before his attention could be gained. In a low, whining tone he would say: "Oh, my head bothers me. You don't know how I suffer, and my stomach bothers me, too. The voices say all things to aggravate me, they got my head all upset, they keep my head rattling in there, they call me bad names and say that I am a bad man, the same gang keep calling me names day and night. I hope I will die, that's all I care. My head gets tight and then it whispers and buzzes. I can't get my thoughts together." He did not mingle with other patients and usually sat apart in the ward, his head bowed, rubbing his forehead and picking at his arms. He could not tell where his home was. When asked if he had been a bank official he replied. "'No, everyone asks me that. I had no business. Someone is controlling my mind. They tell me everything. One man said I killed someone. I never bothered anybody, I never harmed anyone. Oh, I want to get out of this world, that's all."

There was no change until the fall of 1932. At that time psychotherapy was attempted. With much effort a slight interest was stimulated in quite impersonal matters. He was urged to study the habits and characteristics of the birds seen from his ward window. With the encouragement and guidance of his physician he began to observe the stars and to read a simple textbook of astronomy. In January, 1933, he said: "I never was interested in anything until this doctor . . . . this doctor right here, ... Dr. Mather," he said after refreshing his memory from a slip of paper in his possession, "suggested a few things to me. I am trying to find interest in such things as these. I meet with so much opposition when I try to get a true conception of this matter. It is strange, I have a lot of opposition. I pick up this book as fascinating as it is and the first thing I know the book is away off."

In April, 1933, he became approximately oriented, knew the date and the names of a few people about him. After a visit from his wife he said: "A lady came to see me. I have a persistent feeling she is my wife," but declared he had no recollection of any former acquaintance with her. He complained of terrifying dreams but said he had not heard strange voices for two or three months. In the late summer of 1933 he was taken for walks and his interest in natural phenomena and environmental matters rather rapidly increased although he was subject to moody periods. During all this time he was seen by the psychotherapist for at least three hours a week. Impersonal

matters of his former life were discussed. Cautiously and slowly family relationships and situations were broached and memories concerning them gradually revived. He began to read books and papers and to play cards with other patients. He gave lessons in French to physicians. He began to show curiosity concerning his situation and the charges against him. He realized the general nature of these charges but had no recollection of details connected with his offense. He proposed that he enter a monastery after he should have completed any sentence he might receive. When discouraged in this plan by certain church officials he expressed the intention of ending his life after leaving the hospital. His situation was discussed with him in an increasingly personal manner, his periods of depression became less, his interest in environmental activities increased, he discussed his situation with increasing objectiveness, desired to consult a lawyer as to his trial and after a time to form plans for resuming a useful place in the world when released from confinement. Improvement continued and for the past two months he has seemed entirely recovered except, I think, for an amnesia for certain details of his embezzlement. Physically, the patient has made striking improvement and has gained 20 pounds. He will soon be certified back to court for trial, a step that has not already been taken because of certain reasons not bearing on his mental condition.

One should, of course, be conservative in attributing this man's recovery to psychotherapy. For over four years, however, he had shown no improvement and when psychotherapy was begun the various psychiatrists who had seen him considered his case a hopeless one. The improvement, beginning as rapport was established, then extending with the revival of impersonal interests, and continuing with a gradual exploration of mental areas previously prohibited psychologically, suggests, in the absence of any other change in the situation, that psychotherapy may have been an important factor in the patient's recovery.

In but few instances will such striking changes follow psychotherapy yet the lesser degree of constructive aid that can be given to an appreciable number of patients will be gratefully received by them if the psychiatrist succeeds in gaining an understanding of the motivation, experiences and tendencies that have produced their particular mental attitudes and reactions.

FOOD SERVICE IN INSTITUTIONS OF THE NEW YORK STATE DEPARTMENT OF MENTAL HYGIENE.*

By PHILIP SMITH, M. D., New York City.

The problem of food service in our state institutions is one which periodically comes into the foreground in regard to what steps should be taken for its general improvement.

In the smaller institutions this question does not offer as many difficulties as in the larger ones, but in general complaints are made from time to time in all of them regarding deficiencies and faults which should be corrected. It is not my purpose to take up the subject in great detail for there are so many angles from which it can be considered that sufficient time is not now available. I shall, therefore, confine myself to a brief consideration of a limited number of essentials which should be stressed and developed.

In the first place, it is of importance to consider whether the institution is for psychotic, mental defective, or epileptic patients as problems arise in some institutions which do not exist in others; the physical and mental condition of the patient also offers problems which must be analysed and solved. A uniform program cannot be carried out to meet the needs of all patients: some are quiet and depressed, others disturbed, irritable, and quarrelsome and again there are the deteriorated, feeble-minded, epileptic, also those who are acutely ill, infirm and bed-ridden, all are well known types in our state institutions.

The reception service as a rule is not very large and although all classes of patients are admitted attempts are made to segregate them until regularly examined, classified and transferred to wards in which they properly belong. To many of the new admissions, the change from their former environment acts in an unfavorable manner and the hospital routine, character of the food and its services are strange and unfamiliar.

* Read at the ninetieth annual meeting of The American Psychiatric Association, New York City, May 28–June 1, 1934.

The surroundings may have an austere appearance and there may be objections on the part of some patients to associate with others who show crude manners or unclean habits. Special attention must be given to such objections and especially to those patients who show a reluctance or aversion toward taking any or a sufficient amount of food. Often this reluctance may be of a fanciful or delusional nature but it must be dealt with in a manner which will be constructive and not destructive in its effect. In general, it can be stated that all conditions must be met and means must be devised which serve the best interest of the patients depending on their reaction to care and treatment.

In making provisions for patients' maintenance, economy is always a point which is stressed and appropriations for food are made according to a fixed ration allowance for each patient. This has been studied very carefully and the aim has been to provide a sufficient variety of staple articles so that a well balanced dietary can be arranged for all meals. From time to time revision is necessary and there may be some change in the ration of some of the food articles. In this way a fairly satisfactory plan is offered upon which estimates for an adequate diet for the population of an institution can be based. These estimates are required to be submitted quarterly to the Department of Mental Hygiene in Albany and there they may be revised as to quantity, quality or cost. The amount of each article is based on the estimated population for the ensuing three month period, including in this number patients, officers, and employees living in the institution: employees receiving commutation in lieu of maintenance are not included. The daily ration allowance per person at the present time is as follows: Meats, 9 ounces; farinaceous food, 13 ounces; potatoes, 10 ounces; eggs, 1; milk, $1\frac{1}{2}$ pints; butter, 2 ounces; cheese, $\frac{2}{5}$ ounces; sugar, $2\frac{1}{2}$ ounces; tea, $\frac{1}{5}$ ounce; coffee, 1 ounce; fruit, 25 cents per week per person. Modification of this ration allowance may be made to suit unusual conditions which may arise in any institution upon application to the department. After the estimate has been approved, it is the problem of each institution to plan the proper distribution of the food for the ensuing three months. Unless care is exercised there may be an abundance in the beginning and a scarcity and lack of variety at the close of the period.

The distribution of the various food articles must be made so as to meet the conditions in connection with officers, employees, and patients; some variation must be arranged for these three groups and a proper and sufficient amount must be provided for each person. Attention must be given to ensure the least amount of waste and that every patient partakes of the allotted amount. Routine service and placing the food before a patient and at the end of a certain period removing the plate do not constitute sufficient attention. Often patients are negativistic or abstracted and will leave the food untouched unless stimulated in some way or even spoon-fed. Lack of attention to this detail will result in a large amount being wasted. The general nutrition of patients may become impaired although figures may show that there is sufficient provision and also that the patients have been going regularly to the dining room at meal time.

Supervision of food and also of patients at meal time is essential and should not be left entirely to attendants or non-medical officials or other employees. It is a rule and custom for physicians in charge of services to make periodical inspections of the meals in all institutions and this should be continued. There is a tendency to regard this work somewhat outside of the general line of duty of the psychiatrist but in order to bring about recovery and rehabilitation, attention to the physical condition plays as important a rôle as attention to the mental condition.

Variety in the character of the food offers difficulties in many institutions; complaints are made that there is no change in the meals and that the same articles are served over considerable periods of time. The lack of fresh vegetables and fruit evokes comment as well as the character of food of a carbohydrate and protein nature. In considering the staple articles of food which are purchased for institutions through the Department of Purchase, it is found that they are always of good quality and unless of the required standards they are rejected. No substitutes for butter, cheese or similar products are permitted to be purchased according to a provision in the agriculture and markets law. Milk must conform to the standards established by the State of New York and must have been produced and handled in accordance with the requirements of the state sanitary code. Meats must have the standard qualities and are rejected if found deficient in this respect.

Frequently it is found on investigation of complaints about food that they are in a large measure due to lack of attention to modes of preparation and combinations which can be made out of the different articles which are provided; or that they are prepared in an improper manner by employees who know very little about food values and lack training and judgment in such matters as palatability and taste. Experience shows that one cook can render food unpalatable or tasteless while another may take the same ingredients and with attention to details of cooking and seasoning may produce something which is wholesome and attractive.

Fresh fruit and green vegetables are not always available in adequate amounts and canned goods as well as dried fruits may have to be substituted in the cold seasons of the year. Although such articles are not as desirable as the fresh product still there are many ways in which they can be prepared to be tasty and palatable. Preparations of various dishes of a carbohydrate and protein nature can be made either by a change in the cooking or baking process or by the addition of or in combination with other ingredients. Lack of proper attention to the cooking process as well as to the time of service is a fertile cause of dissatisfaction with the meals. It cannot be expected that over-cooked or half raw food or food which has been prepared for hours and allowed to stand will be as satisfactory and palatable as when served soon after it leaves the stove or oven.

Weekly dietaries are submitted to the central office in Albany for examination. It has been found that there is considerable variation in the several institutions as to details. This variability is due to supplies which are on hand, the amount of fruit and vegetables which are produced on farm land in those institutions which have a large amount or arable ground as well as other variable or fixed factors. In some institutions this variation is due to a greater preponderance of bed patients while in others there is a greater proportion of able-bodied and working patients. These dietaries are prepared on a basis of having a light meal for breakfast and supper and a heavier meal in the middle of the day. However, in some of the institutions, supper is the heavier meal and in all of them a special heavy dietary is prepared for working patients. The dietaries

are usually planned on the ration allowance but may be based on a calory computation of the articles of food which enter into the meal.

The aim is to have as much variety as possible for the three meals of the day with the aid of the farm and garden produce and at the same time to keep within the ration allowance. Due consideration is given as far as possible to religious beliefs of the population by serving fish on Friday for Catholic patients and matzoths for Hebrew patients when religious festivals occur. The average breakfast consists of cereal with milk, bread, butter, and coffee with milk; dinner of ham and eggs or meat in the form of hash, stew or roast, soup, potatoes, vegetables, bread, butter, tea or coffee, some form of pudding or fruit. Supper as a rule contains some form of meat but there may be eggs or fish, bread, butter, tea and some fruit or fruit sauce. Variable kinds of fruit are served with at least one meal a day and oftener, depending on the supply on hand. Working patients receive a heavier meal with some form of meat at each meal. In order to increase the amount of fruit and vegetables, some of the hospitals can and dry products raised on the farm land. Stewards also give considerable attention to increase green food purchases as far as possible within the ration allowance.

The articles of which the meals are composed show that there is no deficiency in the number of calories, protein and carbohydrate content, mineral elements and vitamins necessary to maintain a normal state of health.

There has been a gradual change in the kitchens of our institutions and their equipment and from the earlier viewpoint of having many single units the trend has been toward the establishment of a large central unit or several large units from which service can be made to the different parts of the institution. The plan of a large central kitchen has been carried out in the newly constructed institutions but in the older hospitals such a plan is not feasible due to the geographical situation of the various buildings, some of which are of new construction and were added to increase the capacity for patients. In these institutions there may be as many as five or six central kitchens; this leads to a reduplication of help as well as equipment. The aim is to construct large roomy and airy kitchens and to provide for proper light, ventilation and

carrying-off of steam and odors. The old iron cookers have been replaced by aluminum cookers and new types of ovens for baking and roasting have also been installed as well as labor saving machines for mixing and cutting-up food. Attention is paid as far as possible to safe-guards and protection against injury and that the machines are not operated by any one other than attendants who are familiar with their working. Mechanical dishwashers and washing machines for vegetables as well as machines for preparation of vegetables have been installed in pantries connected with the various kitchens.

Central dining room service has been carried forward as much as possible although this offers the same problem as the kitchens in the older hospitals. The argument against large central dining rooms is that there is not the home-like appearance as in the small dining rooms. While this may be true the argument against many small units is that there is a division of service, more help is necessary and there is less economy than in the case of the large congregate dining rooms. Whenever any activity is divided and separated it requires more personnel than when centrally directed. A further point is that the division of the service of food into several separated dining rooms may result not only in delay, but also in the food reaching its destination in a less favorable condition than when served from a central source; again in the dining rooms of the new institutions smaller rooms have been constructed adjoining the larger congregate rooms and in these patients can be accommodated and a considerable degree of privacy be attained.

The matter of dining room equipment is very essential as the appearance of a dining room often has a stimulating effect if clean and attractive, otherwise it may produce a feeling of aversion or repugnance. The long wooden table, bent wood chairs, iron knives, forks and spoons and the tin table ware have as far as it is possible to do so been eliminated from all institutions. The custom to have the tables covered with oil-cloth or linen is no longer followed as this often led to an unsanitary and uncleanly appearance due to spilling of food. The universal trend is toward smaller tables for not more than four to six patients and also single tables for one patient, strong and attractive wooden chairs, china table ware as far as possible, except among the more acutely disturbed patients

and cutlery of some non-rusting white metal. Instead of oil-cloth and table cloths, tables are now used with a top covering of some composite material which is easily kept clean. This, when new, is confined at the sides by small slats of wood but there is a tendency for the wood to warp away from the composite top covering and later to afford a place for moisture and food to lodge and decompose. The objection has also been raised that the tops are likely to become stained by some food which becomes spilled. The most satisfaction is expressed in regard to tables with tops of formica, a composite material which can be obtained in different shades. The objections against its universal use is that it is quite expensive and through carelessness or rough usage chipping of the edges may occur.

An innovation has been adopted in many of the institutions in having the windows supplied with draped curtains of some cheap material. These can be decorated by means of stencils or stitching so as to have a very attractive appearance. The use of paper doilies for some of the more orderly patients is a further improvement. A means of adding to the attractiveness of the dining rooms is to have a regular uniform for employees, also clean white coats and trousers for male patients and dresses of printed material with white aprons for female patients who assist in the service of food. It is also important that all engaged in the preparation and handling of food should be free from any infectious or communicable disease. All institutions have adopted rather uniform procedures to meet such requirements in the examination of personnel engaged in this work. In addition to these procedures some of the institutions are devoting attention to the elimination of noise in both kitchens and dining rooms by introduction of acoustic treatment. Due attention to walls, floors and furnishings regarding cleanliness and sanitation adds to the general comfort and tends toward increasing appetite and desire for food.

It is very important to have adequate and proper personnel and the old adage holds good that good tools are necessary for the performance of good work. Good cooking is in the nature of an art and although claim may be laid to the title of cook there may be an entire lack of a fundamental knowledge or the ability to prepare well-balanced meals. Under the old régime, which still

continues in most of the institutions, the meals are planned by the chef and prepared by him and his helpers either in a central kitchen or in the several kitchens which may exist. Raw foods are purchased by a central purchasing department: amounts are delivered according to the approved estimates to the storerooms which are in charge of the steward's department. The chef makes requisitions for the daily supply to the storeroom.

Good cooking and planning of meals is mainly dependent on the chef and unless he has had special training in this direction, a considerable amount of defect may arise in regard to the general health of the population of the institution. There is a great tendency on the part of all who are engaged in cooking food to do so in a manner which is most advantageous for themselves without any regard to those who are to eat it: careless cooking may result in a loss of most of the nutritive value. The psychological effect is unfavorable and leads to unrest, dissatisfaction and complaint. The position of general supervisor of food service has been created but up to the present time no candidate has been considered as having the general all round qualifications to fill the position.

At the present time estimates are prepared by the steward based on the ration allowance and the meals are planned by the chef. A routine procedure has been followed in this respect. Often this entire personnel has had very little training except that obtained in the institution in which they are employed. Many of them have occupied subordinate positions and have by grades of promotion attained higher positions. The general knowledge of food values, vitamins and calory content is small or lacking and as a result menus are poorly planned from a nutritional point of view and there is much waste from such a system.

It is becoming more evident that the planning, rationing, and preparation of food should be in the hands of persons who have had training in these special fields and that a dietitian or an experienced and trained chef should have charge of this work. Several institutions have taken steps to create such a position although no special appropriation has, up to the present time, been made. The opinion is expressed that a good dietitian is a decided step forward but the objection is made that all who apply for such a position are not qualified and also that it leads to discord as the kitchen

personnel show a disinclination to take orders from such an employee. However, in those institutions where there is an active dietitian favorable comments are made and it is conceded that a marked change is noticeable in the improvement of the food service. The dietitian attends to planning of the meals, holds consultations as to supplies on hand in the store-room, gives individual attention and direction to cooks and other personnel and in general exercises supervision over the preparation in the kitchen and service in the dining rooms. There is a greater variety and the food is served warm in a more wholesome and palatable manner.

Special diet for feeble and infirm patients, for those suffering from acute physical disorders and those showing a negativistic attitude toward regular consumption of food is arranged with the aim in view that it has a high nutritive value and contains the necessary calories and vitamins. Such diet is prepared under special supervision by the nursing force in the diet kitchens connected with wards for this class of cases as this is a medical matter and should receive medical supervision. In cases which require tube-feeding, attention is especially necessary to maintain the nutrition of the patient as the negativism may continue over a prolonged period of time.

Where there is a considerable distance for transportation of food from the kitchen to the dining room, portable asbestos-lined food carts are used and steam tables, heated by electric attachment, also have been installed to keep the food warm; the food is portioned out by dining room attendants. On wards for ambulatory patients the ward attendants accompany patients to the dining rooms and supervise the service of food to patients of their respective wards. Although every precaution is followed to have efficient service in large congregate dining rooms, difficulties are encountered in that congestion occurs, patients become unruly, food in being passed in a common dish from one patient to another for individual helping becomes spilled and often an unclean condition of the table and floor is the result. Consideration of a way to avoid and eliminate objectionable features have led to a growing popularity of the cafeteria system. Some institutions are very enthusiastic and report operation for practically the entire patient and personnel populations; others are more conservative and express the opinion that

cafeteria service works very satisfactorily for units of about 250 or more but not for small units. Others are opposed to such a service and express preference for the continuance of the former dining room service.

In a number of institutions, while cafeteria service has been installed for patients, no steps in that direction have been attempted for the personnel. However, on inquiry in those institutions in which there is cafeteria service for the personnel, the general opinion is expressed that it is much more satisfactory than formerly.

Arguments can be advanced both in support of and against the cafeteria service. In those with a fair proportion of patients who are quite well adjusted to hospital routine and remain for long periods, personal service by such patients is very satisfactory if carried out under direction and supervision of attendants. Also in small dining rooms with small tables the general homelike attitude can be maintained. The same can be stated of an institution like Craig Colony for epileptics, where there are a large number of cottages of small capacity both for male and female inmates, each with separate living quarters and kitchen and dining room. In the state schools where the inmates remain for long periods, they can be trained to perform routine service in a very efficient manner. In large units, especially in the institutions for psychotic patients, the opinion is expressed that cafeteria service is more satisfactory. By providing for a proper in-flow and out-flow congestion is avoided and satisfactory results are attained. Patients can enter the dining room in relays and groups can be segregated as they come from the wards in such a manner that the more noisy, uncleanly and disturbed cases can be fed at different sittings, and one group may already have finished and may leave when another is entering on the opposite side of the dining room. Other points in favor of cafeteria service might be mentioned; it is easier to see that an adequate amount is given to each individual; there is less tendency toward waste; cleanliness of tables and floors is maintained in a better manner; there is better order and supervision.

In conclusion, it can be stated that food service is fairly satisfactory in all institutions but there is room for improvement. An adequate amount of food is provided and according to the last

general statement the state appropriated for food alone in all state hospitals and institutions for mental defectives and epileptics, the sum of $4,228,615.81. The rationing, planning, and preparation of meals is mostly performed by persons who have had no training in these special fields. The position of a general food supervisor should be filled and a well-trained dietitian should be employed in each institution, capable of taking charge of this planning, rationing and preparation of the meals, and to direct and instruct the cooks and subordinate personnel of both kitchens and dining rooms. Although higher compensation would be necessary, it would lead to a higher degree of efficiency, prove of economic value, and add to the mental and physical health as well as the general comfort and contentment of the entire population of our institutions.

THE MEDICAL APPROACH TO THE STUDY OF BEHAVIOR DISORDERS OF CHILDREN.

A Critical Analysis of One Thousand Cases Studied at the Child Guidance Home.*

By LOUIS A. LURIE, M. D., Cincinnati, Ohio.

For the past few years, the trend in child guidance work has been definitely toward the psychological, or more specifically, toward the psychoanalytical interpretation of behavior disorders of children.

The environmentalist with his social approach to the study of the problem child was the first to supplant the organicist, and now he in turn is being supplanted by the psychologist and psychoanalyst. Each one, as he supplants the other, does not deny him entirely but, nevertheless, relegates him to a very minor position. No one, not even the most rabid psychologist, disputes the fact that there is a medical aspect to child guidance work, but it is considered a relatively minor one; one which, if present, should be perfectly obvious to even the merest tyro child guider and, furthermore, one that can be very easily dismissed with a word or wave of the hand.

This was brought out very strikingly at a recent meeting of the American Orthopsychiatric Association. At the symposium on treatment, which fortunately was limited to members, the approach was entirely psychological and, when the president of the organization humorously asked if anyone had anything to say regarding the efficacy of castor oil in the treatment of problem children, the question was received with smiles of amusement by the members. It was answered by one of the physicians (to whom the question had been addressed) in these words, " we have learned so much about psychotherapy that we have not had to fall back on castor oil or pink pills." [1]

It is this attitude that accounts for the highly critical and caustic articles of such men as Bronson Crothers, Joseph Brenneman

* Read at the ninetieth annual meeting of The American Psychiatric Association, New York City, May 28–June 1, 1934.

and Borden J. Veeder. These physicians, sincerely interested in child welfare in its larger aspects as well as in the more special phase of child guidance, are primarily dissatisfied because they feel that the control and guidance of this work is apparently drifting away from medical direction.

To quote Veeder: "The pediatrician knows that the totality of the child must be considered. While one realizes that the mental side of a child's growth and development is important, unfortunately one finds, instead of the definite scientific data available on the physical side, a mass of material on the mental side, contradictory and theoretical, on which one is unable to pass sound judgment. If there is one definite duty which the psychiatrist owes the pediatrician and the practicing physician, it is that of clarifying this situation. One looks upon the psychiatrist as the physician whose function it is to know the mind in its normal as well as in its abnormal development. The 'child guidance' movement is one that interests the pediatrician and I believe that it is more nearly related to pediatrics as a whole than to psychiatry. As the pediatricians have come to see the problem, its chief value lies not in its existence as a separate unit or field but rather in the possibilities for its close incorporation into the complete *medical program* for the child. While isolated units may be needed for specific purposes as in the schools for educational problems or in association with juvenile courts, the most important place of the clinic is in the medical school in intimate association with medical education." [2]

We are all agreed that child guidance activities involve the utilization of medical, psychological, psychiatric and social services as integral parts of a single organization. However, we must always bear in mind that the child himself must be the key to our approach in the study of the psychopathology of behavior disorders of childhood. This carries with it, the implication of the tremendous importance of the medical approach to the study of the problem child.

After all, behavior disorders are "but symptoms of deeper stresses and difficulties." Obviously, we cannot understand these deeper stresses and strains and outline sound therapy unless we understand the child himself. While we recognize the fact that the child is, to a large extent, the product or expression of the action and reaction between himself and his total milieu, still it is the child himself to whom we must in the last analysis direct our study.

At the Child Guidance Home, the importance of the medical approach in the understanding of the psychopathology of behavior disorders of childhood has always been recognized and stressed. During the past ten years, in teaching the medical students of the University of Cincinnati, every attempt has been made to impress upon them this point of view.

Every child admitted for study and observation is looked upon primarily as a sick child (in the medical sense) and as such is subjected to a very thorough and painstaking routine psychophysical examination. In addition, during the period of observation, which may last for several months, daily notation of the child's conduct reactions are carefully recorded by members of the staff. The record, therefore, represents a dynamic study of the child's behavior under carefully controlled environmental conditions.

Incidental to this method of study is the eliciting of the assets of the problem child as well as his defects and handicaps. It should be remembered that in dealing with the problem child it is necessary to know more than his weaknesses and defects. Essential as this knowledge is in understanding the underlying causes of the problem that the child presents, still from the standpoint of cure or correction, a knowledge of his assets is just as important. Very often, the child's defects cannot be corrected. In such cases, he may still be socially rehabilitated through the intelligent manipulation of his assets.

Thus the record contains not only a detailed analysis of the child's physical, mental and emotional make-up, and an estimation of his assets, both actual and potential, but also gives a panoramic view of his social reactions during the time he is under observation. All these data, after being juxtaposed against the factors of the child's environmental background, are then carefully evaluated.

Such an intensive and extensive study of more than 1000 cases over a period of 12 years shows a preponderance of endogenous or psychophysical factors as opposed to exogenous or environmental factors in the causation of behavior disorders of children.

Another result of this method of study has been the accumulation of a large number of facts that has permitted us to attempt a classification of the fundamental causes of behavior disorders of childhood. As pointed out by Kanner and others, in dealing with medical students, physicians, psychologists, social workers and educators,

we are constantly confronted with the justifiable demand for an outline of fundamental causes. We have attempted such an outline and, while we realize that it may be open to a great deal of criticism, especially on the score of over simplification, we feel that it answers the need for categories that will permit not only the directing of therapy to the focal point but also permit of uniformity in case presentation by workers in this field.

The classification of causative factors that we have proposed is based upon a very simple, major premise. Behavior is always an affair of stimulus and response between the individual and his environment. Hence, if the behavior deviates from the so-called normal standard, it is justifiable to infer that (1) either the individual is at fault or (2) the environmental factors are at fault, or (3) that both the individual and the environmental factors are responsible. Elaborating on this idea, we have termed the first group of causes, endogenous; the second, exogenous; and the third, heterogeneous. These three groups have been further subdivided into various sub-groups as shown in Table I.

TABLE I.

I. Endogenous:
   1. Somatic disorders.
   2. Disorders of the central nervous system.
   3. Endocrine disorders.
   4. Deviations in intellectual status.*
   5. Psychoneuroses.
   6. Psychoses.
   7. Constitutional psychopathic states.

II. Exogenous:
   1. Home.
   2. Neighborhood.
   3. Combined.

III. Heterogeneous.

In this scheme, when the cause of a behavior disorder has been classified as endogenous, it does not necessarily exclude the presence of exogenous factors. Neither does classifying the cause of a be-

* Subgroup 4, deviations in intellectual status, requires a word of explanation. In this category are placed those cases in which the behavior difficulty is due primarily to the intellectual status as determined by psychometric tests. Hence it includes problem cases due to superior as well as to inferior intelligence.

havior disorder as a psychoneurosis, for example, necessarily exclude the presence of a somatic disease or an endocrinopathy, in addition to the psychoneurosis. Almost every case of behavior difficulty shows an admixture of physical, psychological and environmental factors. The predominant factor, however, is the one that determines the category in which the case is placed. The question of which factor is the predominant one is not merely one of academic interest. After all we are interested in results, and good results cannot be expected to follow if the therapy recommended is based on inexact knowledge of the underlying causative factors. Whether the treatment will be psychological, sociological or medical must obviously depend upon the nature of the predominant cause.

The belief most widely held, is that environmental influences constitute the largest single group of factors responsible for be-

TABLE II.

Group.	No. of cases.	Per cent.
Endogenous	490	49.0
Exogenous	230	23.0
Heterogeneous	280	28.0
Total	1000	100.0

havior disorders of children. This view is not borne out by the statistics of the Child Guidance Home. As stated above, an analysis of the first 1000 cases studied at the Home, shows a preponderance of endogenous causes.

In this series there were 631 boys and 369 girls, and their ages ranged from 4 to 18 years, the bulk of the cases falling in the age range, 6 to 13. The distribution of these cases according to the dominant causative factors is shown in Table II.

This table indicates very clearly the relative importance of the various causes. In almost half of the cases, the factor or factors responsible for the behavior difficulty resided in the child himself, and environmental influences were solely responsible for the abnormal condition in less than one-fourth of the cases. In other words, from the etiological standpoint, endogenous causes were more than twice as numerous as exogenous causes. Not only this, but the endogenous causes nearly equaled the combined total of

exogenous and heterogeneous causes. In anticipation of possible criticism, it can be stated that the cases studied at The Child Guidance Home are not selected cases but are fairly typical of the types of problem children studied at child guidance clinics.

Table III shows shows the distribution of endogenous causes according to the various subgroups. From this it can be seen that disorders of the central nervous system constitute the most frequent cause.

Such a finding is neither startling nor unexpected as we naturally associate human behavior with neural activity. Hence, it is not surprising to find such a large number of conduct disorders due to disorders of the central nervous system.

TABLE III.

ENDOGENOUS CAUSES.

Subgroup.	No.	Per cent of total.
1. Somatic disorders	64	6.4
2. Disorders of central nervous system	132	13.2
3. Endocrine disorders	91	9.1
4. Deviations in intellectual status	83	8.3
5. Psychoneuroses	70	7.0
6. Psychoses	22	2.2
7. Constitutional psychopathic states	28	2.8
Total	490	49.0

The large number of cases, however, that were caused by disorders of the endocrine system is significant. With the increase in our knowledge of the activities of the endocrine glands, we are learning more and more of the close relationship that exists between the physiological functioning of these glands and the personality make-up of the individual. The activities of the ductless glands are intimately bound up with all development, physical as well as mental. Not only is our stature and shape largely determined by the various glandular secretions but our mental capacity and personality make-up as well. A disturbance in the glandular secretions will not only produce physical abnormalities but mental abnormalities as well. As elsewhere pointed out by the author, "disturbances in glandular function may lead to behavior difficulties either directly or indirectly; directly, as in cretinism where the lack

of thyroid secretion is responsible for the mental retardation; indirectly, as in those cases in which as a result of physical malformation, such as midgets and giants, the individual develops abnormal mental attitudes and personality traits which make normal social adjustments very difficult if not entirely impossible."[3] The need for a thorough endocrine study of every child who presents a behavior disorder therefore becomes apparent.

Further analysis of the endogenous causes as shown in Table III shows that in approximately 75 per cent of the cases, the causes are organic in nature. Less than 25 per cent of the cases therefore, call for psychotherapy as the fundamental method of treatment. Here again, as in discussing the classification of etiological factors, it is realized that treatment of a behavior difficulty may demand, and

TABLE IV.

	Sex.			
	Male.		Female.	
Group.	No.	Per cent.	No.	Per cent.
Endogenous	293	46.6	183	50.0
Exogenous	159	25.2	72	19.5
Heterogeneous	179	28.2	114	30.5
Total	631	100.0	369	100.0

very often does demand, many forms of therapy. Social, psychological, and medical therapy must often be combined in the treatment of conduct disorders. In child guidance work, even more than in general medicine, it is essential to recognize that good therapeusis demands that we treat the individual as a psychobiological unit. However, whether the principal form of therapy will be psychological or medical must, in the great majority of cases, depend upon whether the predominant causative factor is organic or functional in nature.

The bearing of the sex of the child upon the nature of the behavior problem has been the subject of many articles and much discussion. Comparatively little, however, has been written on the relationship between the sex of the child and the causative factor or factors involved in the behavior difficulty. Judging from Table IV there appears to be no definite correlation between the two.

Although exogenous factors are apparently more prolific in producing conduct disorders in boys, still the percentile difference between the two sexes is so small as to be almost negligible. The same holds true for the endogenous group where the reverse condition exists. However, an analysis of the sex distribution in the subdivisions of the endogenous group reveals a rather significant finding.

Twenty per cent of the girls were problem children primarily because they were psychoneurotic. This compares with 11.9 per cent among the boys. The greater emotional instability of women as compared to men has long been an accepted medical fact but the

TABLE V.

ENDOGENOUS CAUSES.

	Sex.			
	Male.		Female.	
Subgroup.	No.	Per cent.	No.	Per cent.
Somatic	36	12.2	23	12.5
Disorders of the central nervous system.	84	28.6	43	23.4
Endocrine disorders	54	18.4	35	19.1
Deviations in intellectual status	51	17.7	30	16.4
Psychoneuroses	35	11.9	36	20.0
Psychoses	12	4.1	8	4.3
Constitutional psychopathic states	21	7.1	8	4.3
Total	293	100.0	183	100.0

figures here given would seem to indicate that this difference between the sexes in emotional stability already exists in childhood. The significance of this fact should be borne in mind, especially by those who are entrusted with the care and guidance of young girls.

In view of the more or less wide belief that the majority of problem children are feebleminded, or at least greatly retarded mentally, the following table showing the intelligence quotients of the children constituting this series of cases is interesting. From this table it will be seen that this belief is erroneous. The intelligence quotient scores given are based upon the Stanford revision of the Simon Binet tests.

Only 157, or 15.7 per cent, of the children rated as definitely feebleminded. One hundred and seventy-eight, or 17.8 per cent,

rated as borderline cases of probable mental defect. These two groups together constitute but 33.5 per cent of the total. In contrast to this, we find that 44 per cent of the children rated either normal or superior. If to this number is added the number classified as subnormal, the total is 66.5 per cent. Furthermore, deviations in the intellectual status accounted for only 83, or 8.3 per cent, of the problem cases of this series.

TABLE VI.

I. Q.	Rating.	No.	Per cent.
110 and above	Superior	85	8.5
90-110	Normal	355	35.5
80-90	Subnormal	225	22.5
70-80	Borderline	178	17.8
63-70	High grade moron	65	6.5
58-63	Middle grade moron	28	2.8
50-58	Low moron	28	2.8
25-50	Imbecile	36	3.6
0-25	Idiot	0	.0
Total		1000	100.0

Summary and Conclusions.

An analysis of one thousand cases of behavior disorders of children studied at the Child Guidance Home shows the need for reorientation in child guidance work.

In 49 per cent of the cases, the underlying causative factors were found to be endogenous or psychophysical in origin. In only 23 per cent of the cases were the causes exogenous or environmental. In the remaining 28 per cent of the cases, both endogenous and exogenous factors were responsible for the behavior difficulties.

Furthermore, approximately 75 per cent of the cases, falling in the endogenous group, were organic in nature. Psychotherapy as the principal form of therapy was, therefore, indicated in a relatively small number of cases. This finding is of especial interest in view of the present tendency to stress the psychological approach in the treatment of behavior difficulties of children.

In this connection, the results of the psychometric tests are interesting. Only 15.7 per cent of the children were definitely feeble-minded. 17.8 per cent were borderline cases of probably mental

defect; 22.5 per cent were of subnormal intelligence; and 44 per cent were either of normal or superior intelligence. These figures should help dispel the belief so widely prevalent, especially among the laity, that the majority of problem children are either feeble-minded or severely retarded mentally.

The large incidence of endocrine disorders, 9.1 per cent, in this series, as causative factors, merits attention and points to the necessity of an endocrine study of every child who presents a behavior disorder.

The need for stressing the medical approach in child guidance work is, therefore, obvious. Any tendency to drift away from the medical approach in the study of the psychopathology of behavior disorders of childhood must be combated. For this reason, child guidance study should be made an integral part of medical education and should be incorporated in the curriculum of every medical college.

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THE BLOOD GLUTATHIONE (GSH) LEVEL IN MENTAL DISEASES.*

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Introductory.

Previous to the study here reported there existed a rational basis, established from a number of different angles, for expecting that in neuropsychiatric disease there might be found some significant deviation of the blood glutathione (GSH) level from the normal. This substance was until recently considered to be a dipeptide of molecular weight 250, instead of a tripeptide of molecular weight 307, as it has been shown to be by F. G. Hopkins.[1] Owing to its occurrence in a reduced (GSH) form containing a sulphydril group and in an oxidized or disulphide (GSSG) form in which two molecules combine through their sulphur atoms with the loss of two atoms of hydrogen, glutathione probably assists in many important oxidations and reductions in the body. Before developing my reasons for expecting a disturbed blood glutathione level in neuropsychiatric conditions, it may be well to review the extent of our knowledge in regard to this level in pathological conditions other than those essentially neuropsychiatric.

E. Gabbe [2] finds a low blood glutathione (GSH) level in anemia, and that this low level per cent of whole blood is compensated by a high level per single erythrocyte. He reports also that the amount of glutathione (GSH) per erythrocyte was found increased twofold within two hours after hemorrhage in animals. D. Campanacci [3] finds slightly low blood glutathione (GSH) values in diabetes. H. Varela, E. Apolo, and A. Vilar [4] confirm Campanacci's findings in diabetes and also find low values in anemia and jaundice,

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especially obstructive jaundice. They report normal values in hypertension, asthma, carcinoma, and pregnancy. R. Platt [5] reports that in the majority of pathological conditions which he has studied, including cystinuria, the blood glutathione (GSH) level remains within normal limits, though cases of liver disease show rather wide variations. He confirms earlier findings with regard to the corpuscular ratio in anemia and finds the same compensatory corpuscular increase in some cyanotic states. In the leukemias he finds that glutathione (GSH) is a constituent of both the myelocytes and the lymphocytes and also that large amounts are contained in polymorphonuclear leukocytes.

The basis for expecting that the blood glutathione (GSH) level might be found to be disturbed in neuropsychiatric conditions may be outlined under a number of headings:

(a) Sir F. W. Mott in his "Studies in the Pathology of Dementia Præcox" [6] accepts the facts pointed out long ago by Alzheimer [7] whom he quotes as having demonstrated "that the essential histological morbid change in the nervous elements of dementia præcox is one of nuclear decay." He defines this condition a little more specifically as a retardation of chemical activity involving principally lipoids and oxygen, and concludes that dementia præcox is of endogenous origin, the evidence from his own work and that of others tending to localize the site of disturbance as primarily among the intercalary neurones. F. S. Hammett [8] has advanced the theory that substances containing the sulphydril group play a specific rôle in cell division; he even goes so far as to claim that the sulphydril group is the *only specific* chemical factor controlling cell division. C. Voegtlin and H. W. Chalkley [9] have stated without reservation that glutathione, both (GSH) and (GSSG), favors the process of cell division; that the effect is much more marked on mature cells than on young ones; and that on both young and mature cells the effect of glutathione (GSH) is to stimulate the nuclear division more markedly than the cytoplasmic or cell division. In so far, therefore, as certain neuropsychiatric conditions are accompanied by some inherent cellular pathology such an abnormality might possibly be the result of an inadequate supply of glutathione (GSH) or (GSSG) to the cells in question and we should expect to find a lowered level of blood glutathione in these conditions.

(b) Mott [6] also reported from the chemical analyses of brain tissue that there was a marked shift from the normal distribution of sulphur compounds in dementia præcox. This finding also points to the possibility of a disturbed metabolism of the compounds containing sulphur.

(c) O. Lingjaerde [10] reported that in 80 per cent of the cases of schizophrenia in the active phase the function of the liver was disturbed. It is generally believed that the reduction of the disulphide (GSSG) form of glutathione to the sulphydril (GSH) form takes place principally in this organ. While this metabolic change may very likely also occur to some extent in other organs than the liver, and while the liver also unquestionably possesses other metabolic functions which might become abnormal, still the possibility of a disturbed liver function being correlated with a disturbed glutathione metabolism has not yet been definitely ruled out, and one might result from the other.

(d) In so far as the loss of consciousness in neuropsychiatric conditions, which is so frequently commented upon in the literature, may be due to the action of narcotizing autotoxins, a view which is held by some, we might expect to find a lowered level of blood glutathione (GSH), as H. Waelsch and E. Weinberger [11] have shown that narcosis is accompanied by a distinct lowering of the blood glutathione (GSH) level.

E. J. King, L. Baumgartner, and I. H. Page [12] have reported the results of glutathione (GSH) determinations by an iodine titration technic on the blood of six normal individuals and eight cases of melancholia. They found no significant difference between the means of the two groups. The data do not seem of great weight, especially since one case in each of their groups was markedly out of line and six of the eight, or 75 per cent of the values, in the group with melancholia were below the normal mean. S. Gullota [13] reports on having examined the blood of 50 cases of mental disease—36 cases of dementia præcox, 10 epileptics, 2 melancholics, 2 "frenetics"—for glutathione (GSH) by Gabbe's iodine titration technic. His conclusion that the level per cent of whole blood was not altered though the level per erythrocyte was slightly decreased, cannot be given much value, because he did not determine his own normal values but compared his results to normals reported by another worker.

Technical.

The basis of S. R. Benedict and G. Gottschall's [14] method for the determination of glutathione (GSH) in whole blood consists in the preparation of a protein-free blood filtrate and the determination of the substance in the filtrate by comparison against a suitable standard after applying a colorimetric reaction which they claim to be practically specific for reduced (GSH) glutathione. Six and one-half hours are available during which the blood specimen may be held at room temperature before the filtrate need be prepared, and 20 minutes are available for making and recording colorimetric comparisons. The technic is, therefore, admirably suited to the accumulation of data by the simultaneous handling of considerable numbers of specimens through the procedure and their comparison against the same standard. I have found no difficulty whatever in applying this technic. The glutathione (GSH) standard was kept at refrigerator temperature and made up freshly once a month. A fresh working standard was prepared each day and compared to the old working standards. These comparisons showed that if kept in the refrigerator when not in use the working standard did not begin to show any deterioration until the seventh or eighth day. After this finding was confirmed a number of times the same working standard was used for three consecutive days before being discarded and a fresh working standard prepared only twice a week. The 2 per cent sodium bisulfite reagent is also best kept in the refrigerator when not in use and made up freshly every two weeks. The other reagents need only be carefully prepared and stoppered when not in use and are stable indefinitely at room temperature.

Reagents.

Standard.—Dissolve 70 mgs. of pure glutathione (Eastman Kodak Co.) in 100 c.c. of N/10 HCl. This stock solution will keep with no detectable change for at least one month in a refrigerator at 4° C. The working standard is prepared by diluting 5 c.c. of the stock solution to 100 c.c. 5 c.c. of this working standard contains 0.175 mgs. of glutathione.

Tungstomolybdate Solution.—10 gms. of pure ammonia free molybdic acid anhydride are treated in a flask with 50 c.c. of N/1

NaOH and the mixture is boiled gently for from four to five minutes. The molybdic acid used should be of the best grade labelled to contain no ammonia or only "a trace." The mixture is filtered, the filter being washed with about 150 c.c. of hot water. The total filtrate is cooled and mixed with a solution of 80 gms. of sodium tungstate dissolved in about 600 c.c. of water. Dilute the combined solutions to one liter and bottle.

N/0.62 Sulphuric Acid.—Dilute 620 c.c. of N/1 acid to one liter and bottle.

Sodium Acetate 50 Per Cent.—With the aid of heat dissolve 250 gm. of sodium acetate in about 250 c.c. of water. Dilute to about 500 cc., mix, cool, dilute to exactly 500 c.c., filter and bottle.

Sodium Bisulfite 2 Per Cent.—A 2 per cent solution kept at room temperature cannot be counted on for longer than one week, but will keep for at least two weeks if kept in the refrigerator at 4° C. when not in use. A 10 per cent solution will keep at room temperature for a month and dilutions can be made weekly. The color development is retarded if this solution is not fresh.

Arsenophosphotungstic Acid.—100 gms. of pure sodium tungstate are placed in a liter flask and dissolved in about 600 c.c. of water. 50 gm. of pure arsenic pentoxide are added, followed by 25 c.c. of 85 per cent phosphoric acid and 20 c.c. of concentrated hydrochloric acid. The mixture is boiled for 20 minutes, cooled, diluted to 1 liter and bottled. This is the stock solution. The working reagent is prepared by diluting a portion of the stock solution with an equal volume of water.

Technic.

(a) Lake one volume of oxalated whole blood with 7 volumes of water. Excess of oxalate in the blood must be avoided. 2 mg. of oxalate per c.c. of whole blood will produce no effect and is in excess of the amount required to prevent coagulation provided it is mixed thoroughly with the blood when drawn. Add one volume of tungstomolybdate solution and one volume of N/0.62 sulphuric acid and mix. Filter through a high grade filter paper, returning the first few drops after the pores of the filter have become clogged. The decrease in glutathione in the filtrate through autoxidation is reported not to be rapid, amounting at room temperature to about 3 per cent per hour. If the determination cannot be run through at

once the filtrate may be preserved against autoxidation of the glutathione by acidifying immediately with 1 drop of N/0.62 sulphuric acid per 10 c.c. of filtrate.

(b) To 5 c.c. of the blood filtrate and to 5 c.c. of the working standard in test tubes add as nearly simultaneously as possible, 2 c.c. of 50 per cent sodium acetate, 0.2 c.c. of 2 per cent bisulfite and 0.3 c.c. of the arsenophosphotungstic acid working reagent, and mix the tubes by inversion.

(c) Make the colorimetric comparison after 10 and before 30 minutes. Calculation if standard of 0.175 mgs. of glutathione is used:

$$\frac{\text{Reading of Standard}}{\text{Reading of Unknown}} \times 35 = \text{mg. glutathione (GSH) per 100 c.c. of whole blood.}$$

If the determination indicates less than 25 or more than 60 mg. of glutathione per 100 c.c. of blood, it is preferable to repeat the determination using a lower standard or less of the filtrate.

The specimens were collected generally in groups of from 15 to 18 and it was found easily possible to collect and run the determinations on 18 specimens in four working hours. Not a great deal of color is developed in any of the reactions so it is always necessary to set the colorimeter carefully by making a comparison of the standard against itself before running through a series of determinations. No values of less than 25 mgs. or more than 60 mgs. per 100 c.c. of whole blood were encountered in the course of the investigation, so that it was never necessary to take a decreased quantity of filtrate for the determination or use a diluted standard. Determinations in duplicate were not made but three readings were made of each specimen against three different colorimetric settings of the standard, the results being averaged in the final calculation. The material examined consisted in 112 control cases volunteering from among the employees, and 500 patients from the wards of the Veterans Administration hospital at Palo Alto, Cal.

Normals.

The range of normal values found was from 27 to 58 mgs. per 100 c.c. of whole blood. But one value lower than 32 was found and but one value higher than 52. This range is in excellent agreement with Gabbe's [2] reported range of 29.5 and 56.6 mgs. The

mean value of the 112 normals was 41, which is in perfect agreement with Benedict and Gottschall's [14] reported normal mean by the same technic. The standard deviation for this group is 4.8 mgs. per cent, placing the normal limits for the purposes of this analysis at from 36.2 to 45.8. The probable error of the mean is ±0.45 mgs. per cent. The distribution curve is shown in Fig. 1.

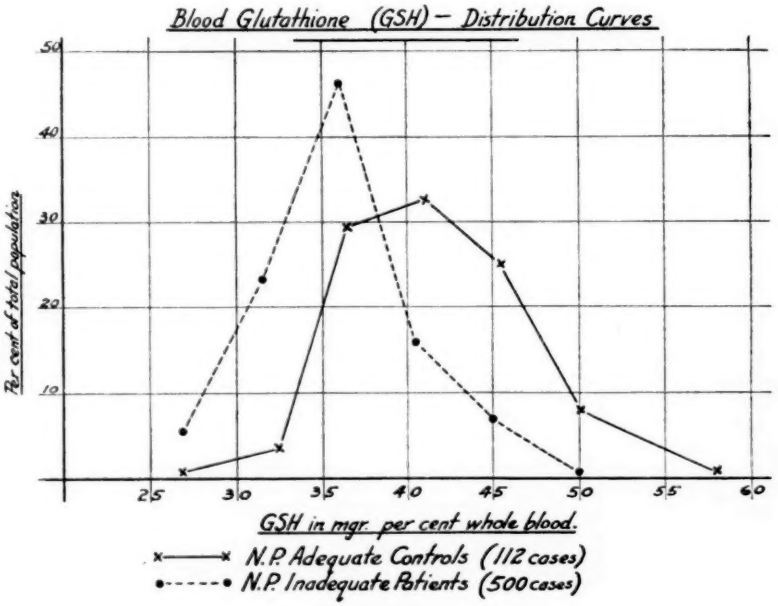

FIG. 1.

FIVE HUNDRED PATIENTS.

The extreme range of values found was from 25 to 52. The mean value was 36 mgs. per 100 c.c. blood. The standard deviation within this group is ±4.3 mgs. per cent, and the probable error of the mean is ±0.19 mgs. per cent. The difference from the normal mean is 10.2 times the standard error of the difference, statistically a highly significant figure. 87 per cent of the values found were below the normal mean and 60 per cent of the values were below the lower normal limit. The distribution curve is shown in Fig. 1.

Three Hundred and Sixty-Six Cases of Schizophrenia.

The extreme range of values found is the same as for the total patient group, the mean is 36 mgs. per cent, standard deviation ±4.0 mgs. per cent and probable error of the mean ±0.21 mgs. per cent. The difference from the normal mean is 10.1 times the standard error of the difference. 89 per cent of the cases fell below the normal mean and 64 per cent of the cases below the lower normal limit.

The data in this group have been subdivided according to type and yield figures for 168 hebephrenics, 139 paranoids, and 57 catatonics. The catatonic mean is 1 mg. per cent lower than the rest of the group, 95 per cent of the values falling below the normal mean, 70 per cent below the lower normal limit. The paranoid and hebephrenic means are the same as the total patient group mean. Among the paranoids 86 per cent of the cases fell below the normal mean, 68 per cent of them below the lower normal limit. Among the hebephrenics 91 per cent of the cases fell below the normal mean, 60 per cent of them below the lower normal limit.

Sixty-Nine Cases of General Paresis.

The extreme range of values is from 25 to 47 mgs. per 100 c.c. blood, the mean is 36 mgs. per cent, standard group deviation ±4.8 mgs. per cent, and probable error of mean ±0.25 mgs. per cent. 84 per cent of the case values fall below the normal mean, 58 per cent of them below the lower normal limit.

Twenty Cases of Manic-Depressive Psychosis.

The extreme range of values found is from 29 to 42 mgs. per cent, the mean 37 mgs. per cent, standard group deviation ±3.2 mgs. per cent, and probable error of mean ±0.71 mgs. per cent. The difference of the mean from the normal mean is only 4.8 times the standard error of the difference which is considerably less than the schizophrenic and paretic differences but must still be considered as statistically significant. 90 per cent of the case values fall below the normal mean, 40 per cent of them below the lower normal limit. The data are not considered of sufficient weight to make a subdivision into manic and depressed types of any analytical value.

Forty-Eight Cases of Epilepsy.

The extreme range of values found is from 29 to 45 mgs. per cent, mean value 38, group deviation ±4.7, and probable error ±1.25; per cent of cases below normal mean 71, and below lower normal limit 29 per cent. The difference from the normal mean is but 2.3 times the standard error of the difference and, therefore, not statistically significant.

Thirty-One Cases of Miscellaneous Neuropsychiatric Conditions.

Thirty-one cases of miscellaneous neuropsychiatric conditions yield a mean value of 35.8 mgs. per cent, practically identical with the total patient group mean. These cases do not represent a dis-

BLOOD GLUTATHIONE (GSH).

(Values are in mgr. per cent of whole blood.)

Group.	No. cases.	Mean.	Standard deviation.	Probable error.	Per cent of cases below: Normal mean.	Per cent of cases below: Normal lower limit.
Controls	112	41	± 4.8	± 0.45	46	14
N. P. patients	500	36	± 4.3	± 0.19	87	60
Schizophrenia	366	36	± 4.0	± 0.21	89	64
Catatonia	57	35	± 3.5	± 0.46	93	70
Paranoia	139	36	± 4.0	± 0.34	86	68
Hebephrenia	168	36	± 4.1	± 0.32	91	60
General paresis	69	36	± 4.6	± 0.55	84	55
Manic-depressive psychosis	20	37	± 3.2	± 0.71	90	40
Epilepsy	14	38	± 4.7	± 1.25	71	29

tinct somatic group and the calculation of standard deviation and probable error is, therefore, footless. One case of cerebral syphilis yielded a low value of 27 mgs. per cent; one case of multiple sclerosis a high normal value of 44 mgs. per cent, two cases of involutional melancholia gave a normal mean of 42 mgs. per cent; six cases of arteriosclerosis yielded a low mean of 36 mgs. per cent, one of them showing 52 mgs. per cent, being markedly out of line; one case of endocrinopathy-dyspituitarism, gave a high value of 46 mgs. per cent.

Discussion.

During the course of the work a daily record of averages was kept, and as it became apparent that the differences being recorded would prove to be statistically significant consideration was given to the question whether any obvious differences of an environmental nature or inherent in the conditions of the experiment existed between the patient and the control groups, which by causing the differences being recorded might invalidate conclusions based on the data. The possibility of a diurnal variation first presented itself. The specimens from the patient group were all taken definitely between the hours of 8 and 9 a. m. The control cases, however, often failed to report to the laboratory before as late as 11.30 a. m. Should a diurnal variation of any significance in either group exist, this fact might invalidate conclusions. A group of five patients (4 schizophrenics, 1 epileptic) and five other volunteer controls was, therefore, selected and specimens taken between the hours 8.07 and 8.37 a. m. and again between 10.58 and 11.31 a. m. on the same day. These determinations yielded the following results:

5 patients at 8.14 a. m., 38.4 mgs. per cent; at 11.30 a. m., 37.6 mgs. per cent.
Net change minus 0.8 mgs. per cent in 3 hours 6 min.

5 controls at 8.30 a. m., 41.1 mgs. per cent; at 11.06 a. m., 39.0 mgs. per cent.
Net change minus 1.1 mgs. per cent in 2 hrs. 36 minutes.

All of the cases remained well in line with respect to individual differences. The net change in both groups being downward, and the net change in the control group being very slightly greater than in the patient group the differences recorded between the groups remain valid and the possibility of a diurnal variation of any significance between the hours reported seems to be remote.

Since Gabbe[2] has reported that exercise increases the blood glutathione (GSH) level it next appeared as a possibility that the amount of work presumably done by the controls at their various posts on the station before reporting to the laboratory being greater than the amount of exercise presumably taken by the patients on the wards before their blood specimens were taken might be a cause of the differences and invalidate the conclusions.

Eight patients (schizophrenics) reported by their ward surgeon to participate actively in the athletic drills were, therefore, selected and their blood specimens taken immediately before and immediately after a half hour's athletic drill period. On the following day specimens were similarly obtained before and after the same drill period from five controls voluntarily participating in the drill. These determinations yielded the following results:

9 patients before drill, 35.5 mgs. per cent; after drill, 36.0 mgs. per cent.
Net change plus 0.5 mgs. per cent.
5 controls before drill, 38.4 mgs. per cent; after drill, 38.1 mgs. per cent.
Net change minus 0.3 mgs. per cent.

All of the cases remained well in line with respect to individual differences. The net changes appear to be insignificant, being opposite in direction, the control cases being downward, the differences recorded between the groups remain valid.

It seems to be beyond my capacity to identify or establish the cause or causes responsible for the differences brought to light in this study. C. Voegtlin, J. M. Johnson and S. M. Rosenthal [15] have found a suggestion in the course of their researches that perhaps there is a physiological relationship between glutathione and copper. Whether or not copper plays a significant rôle in neuropsychiatric disease can only be determined by future investigation. The treatment of dementia præcox with manganese reported by F. M. Chiancone [16] appears in an interesting light in this connection. As has been previously mentioned in this paper when reduced (GSH) glutathione is oxidized two atoms of hydrogen are released. F. G. Hopkins and K. A. C. Elliott [17] believe that though representing but a small part of the total respiration this transport of hydrogen to molecular oxygen by the path of glutathione may prove to represent a highly specialized and significant aspect of the tissue oxidations, and that the quantitative importance of this system is far from negligible. The origin of the active hydrogen which subsequently reconverts the disulphide (GSSG) glutathione again to the sulphydril (GSH) form is at present unknown. Hopkins and Elliott speak of " hydrogen metabolites " and have shown by survival tissue respiration experiments that this pressure head

of active hydrogen consistently differs in its quantitative action in the liver of different species, but their own researches as well as those of P. J. G. Mann [18] and others have failed to disclose the identity of this hydrogen supply system. I have reported in a previous paper the finding of significantly low blood fat values in dementia præcox, and also that the unsaturated fraction of these fats is lowered. When a saturated fatty acid is desaturated hydrogen is released, and it occurs to me that in dementia præcox the low blood glutathione (GSH) and the low blood unsaturated fatty acid values may be significantly correlated. I shall make this question the matter of further study in the immediate future.

Summary.

1. There appears to be a statistically highly significant difference in the blood glutathione (GSH) level between groups of mental patients and adequate individuals.

2. This difference is greatest in catatonic dementia præcox. It is also marked in hebephrenic and paranoid præcox, and in general paresis. It is less marked but still statistically significant in manic-depressive psychosis. In the small number of cases of epilepsy examined it was not statistically significant.

3. Diurnal variation and exercise have been ruled out as influences affecting the validity of conclusions based on the data accumulated in this study.

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A STUDY OF THE VALUE OF BANCROFT'S VIEWS ON MENTAL DISEASE.

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The views of Bancroft and his co-workers relative to mental disease have not been accepted. This lack of acceptance has not been due to their being proven untenable beyond question because very little experimental work has been done upon them other than that in the Bancroft laboratories. There are the papers of Lang and Paterson [1] which experimentally support Bancroft's ideas and add to them. There are the papers of Henderson [2] which vigorously refute the views of Bancroft and thoroughly denounce them. Finally, there is the work of Harris and Katz [3] refuting the value of sodium rhodanate in mental disease, and showing that there is no diagnostic value in the contrasted use of sodium amytal and sodium rhodanate. From the latter paper one gains only by inference that all is not well with Bancroft's views.

It seems that in a branch of medicine such as psychiatry with, at present, its extremely limited therapeutic aids in the chemical field, the claims of Bancroft merit an extensive investigation. If, as the result of sufficient experimental proof, the views are valuable or untenable they should be, respectively, applied or discarded.

It is the purpose of this paper to examine the ideas of Bancroft from a practical experimental point of view in order to add to the proof that the ideas as expressed by Bancroft (whether they were originally his or whether they belonged to Binz, Bernard, or others) are valid or untenable.

Method.

In testing the validity of the ideas of Bancroft and his co-workers, 75 patients were used. This number is greater than that whereby the theory was established and should, therefore, be sufficient. Each patient was studied and classified according to accepted psychiatric terminology thus: manic-depressive, stupor 10;

manic-depressive, depressed 20; manic-depressive, manic 10; dementia præcox, catatonic 10; dementia præcox, hebephrenic 5; epilepsy 5; general paresis 5; paranoid condition 5; alcoholic hallucinosis 5.

The method of treatment closely followed that of Lang and Paterson.[1] Each patient was given sodium amytal 0.8 gm. intravenously the first day and 0.4 gm. orally every 24 hours thereafter for 10 days. Then a period of one week was allowed to lapse after which each patient was given sodium rhodanate 0.3 gm. twice daily, by mouth, increasing the quantity of the drug 0.3 gm. a day until a maximum dosage of 2.0 gm. a day was reached. The patient was maintained at this dosage for one week and then the procedure was discontinued. During this period the mental and physical state of the patient was observed and recorded as unchanged, improved, or worse. When the drug was discontinued it was noted whether or not the patient reverted to his or her original physical or mental state.

Results.

A: Manic-depressive, stupor: Under treatment with sodium amytal, all 10 cases improved mentally and physically as long as the drug was continued. When it was discontinued the patients relapsed into their original stuporous condition. Then they were given sodium rhodanate; no change was observed.

B: Manic-depressive, depression: In the 20 depressions in this group under treatment with sodium amytal the reaction was similar to group A. No change was noted in their condition when they were treated with sodium rhodanate.

C: Manic-depressive, manic: There were 10 cases in this group. Under treatment with sodium amytal three improved but relapsed to their original condition when the drug was discontinued; five remained unchanged; two became much worse. Under treatment with sodium rhodanate no change was observed in any patient.

D: Dementia præcox, catatonic: 10 cases. Under treatment with sodium amytal three cases improved but immediately relapsed when the drug was withdrawn; seven cases remained unchanged. Under treatment with sodium rhodanate no change was observed in any patient.

E: Dementia præcox, hebephrenic: 5 cases. Under treatment with sodium amytal there was no change. Likewise under treatment with sodium rhodanate there was no change.

F: Epilepsy: 5 cases. These cases while under treatment with sodium amytal had no attacks, but when the drug was removed the seizures again became established. Under treatment with sodium rhodanate there was no alteration in any patient's condition.

G: General paresis: 5 cases. When treated with sodium amytal these cases improved somewhat but relapsed to their original state upon removal of the drug. Under treatment with sodium rhodanate there was no alteration in the condition of any individual.

H: Paranoid condition: 5 cases. Under treatment with sodium amytal there was no alteration in the condition of any patient. Likewise there was no change when they were treated with sodium rhodanate.

I: Alcoholic hallucinosis: 5 cases. Under sodium amytal treatment, two improved, and three remained unchanged. When the treatment was discontinued the patients reverted to their original mental and physical states. Under sodium rhodanate there was no change.

Discussion.

Bancroft and his co-workers Rutzler and Richter in a series of papers [4] contend that most mental disorders can be very simply explained by the state of dispersion of the brain colloids. They feel that there are at least two abnormal conditions of these colloids, one when they are over-coagulated and the other when they are over-peptized. In the former group they placed cycloid (manic-depressive) "insanity," epilepsy, and "benign stupor catatonics." In the latter group they place schizoid (schizophrenia—dementia præcox) "insanity," and the alcoholic psychoses. The normal mental state lies somewhere between these two extremes. This being so, they feel that if the "over-coagulated brains" are treated with a peptizing agent, such as sodium rhodanate, in correct proportion, the insanity caused by the over-coagulation will disappear and that if the "over-peptized brains" are treated with a coagulating agent, such as sodium amytal, in correct proportion, the insanity caused by the over-peptization will disappear. Furthermore, they

feel that if a mental disorder caused by over-coagulation or by over-peptization is treated by a coagulating agent or a peptizing agent, respectively, the mental disorder will become worse. In this work Bancroft is supported by Lang and Paterson [1] who also feel that sodium amytal and sodium rhodanate can be used to differentiate between manic-depressive stupor and schizophrenic stupor; that is if a manic depressive stupor is given sodium amytal the stupor will become worse whereas if a schizophrenic stupor is given sodium amytal the stupor will become improved, and vice versa.

As has been stated, it is the fundamental purpose of this paper to examine Bancroft's views of mental disease from practical therapeutic and diagnostic points of view, and not to question the value of sodium amytal in the treatment of certain psychoses. Sodium amytal was used in psychiatric cases and had been proven to be of value long before Bancroft's ideas existed. The dosage of sodium amytal used in this work is not intended to establish curative results, for it is the opinion of the writer that the dosage and duration of treatment are entirely inadequate for either cure or remission.

The diagnosis of the cases can hardly be questioned on the basis of the action of sodium amytal and sodium rhodanate. At no time did sodium rhodanate produce any change in the mental or physical picture of a patient. Therefore from a differential diagnostic point of view the suggestions of Lang and Paterson are invalid.

Again, if, according to Bancroft's views, cyclical "insanity," epilepsy, and "benign stupor catatonia" are due to an over-coagulated condition of the brain there should be improvement in these states when treated with sodium rhodanate, a peptizing agent, and the patient should get worse when treated with a coagulating agent, sodium amytal. However, when these views are applied in the treatment of manic-depressive stupors and depressions the converse is true in almost every case where sodium amytal is concerned, and no change occurred at all when sodium rhodanate is used. The same is true for epilepsy.

In dementia præcox individuals, according to Bancroft, the brain is over-peptized and these cases should improve under treatment with sodium amytal and become worse under treatment with sodium rhodanate. Of the 15 cases under treatment with sodium amytal three showed some transient improvement while 12 cases remained

unchanged. Again there was no alteration of the mental or physical state whatsoever under treatment with sodium rhodanate. These results do not substantiate the claims of Bancroft.

Although no comment was made relative to cases of general paresis other than the two in the work of Lang and Paterson, sodium amytal was but temporarily beneficial and sodium rhodanate of no value at all.

For the paranoid conditions there was no recognition by Bancroft. Nevertheless these are cases of mental disorder. They were not affected at all by either sodium amytal nor by sodium rhodanate.

According to Bancroft, in the alcoholic psychoses there is an agglomeration of the colloids of the nerve cell and they should be improved by sodium rhodanate which peptizes these agglomerated colloids and not by sodium amytal which would further agglomerate them. Of the five cases studied under treatment with sodium amytal, two improved and three remained unchanged. When the drug was discontinued the two improved cases reverted to their original mental state. When the five cases were placed on sodium rhodanate there was no change in the mental or physical condition of the patients. These findings are certainly opposed to the claims of Bancroft.

As a result of these investigations, which are of greater number than those whereby the theory was established, it can be definitely stated that the views on mental disease as postulated by Bancroft are untenable. It does not seem possible that such views, if of value, should so persistently fail when the experimental method is used to test them.

Summary.

1. It is impossible to differentiate between the dementia præcox and manic-depressive psychoses by the contrasted use of sodium amytal and sodium rhodanate.

2. Sodium rhodanate in the dosage used is of no therapeutic value in mental disease.

3. The ideas of Bancroft and his co-workers relative to mental disease and the methods of treating it did not prove to be of any value at all when the experimental method was applied to them. They are therefore untenable.

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CONCERNING AN IMPROVEMENT OF THE PSYCHIATRIC "PROLONGED SLEEP" TREATMENT.*

By M. CLOETTA and HANS W. MAIER.

This communication deals with the development and use of a new preparation for the treatment of certain types of schizophrenic patients by means of prolonged sleep. Somnifen and other barbituric acid preparations, alone and in combination, had not been entirely satisfactory because, among other things, of the occurrence of circulatory disturbances and post-waking excitement.

Cloetta, professor of pharmacology, University of Zürich, sought, by combining several drugs of known sedative qualities, to produce a preparation answering the following requirements: (1) With sufficient therapeutic breadth; (2) a certain means of producing sleep and also capable of quieting excited patients; (3) non-irritating to the bowel on repeated use; (4) the single dose volume not great enough to cause bowel evacuation; (5) capable of inducing sleep quickly and yet the sleep to be a lasting one; (6) not producing excitement afterwards; and (7) at the disposal of the physician in a handy and durable form.

Animal experiments and tests with patients led to the production of the "Cloetta Mixture," a clear solution containing per ccm., paraldehyde, 0.4864 gm.; amylenhydrate, 0.1593 gm.; chloralhydrate, 0.1157 gm.; alcohol 92 per cent, 0.1747 gm.; isopropylallylbarbituric acid, 0.0409 gm.; digalen, 0.0330 mgm., and ephedrine-hydrochloride, 2.4600 mgm. The last two substances have prophylactic action against circulatory collapse. The standard in the mixture is the right proportion of barbiturates to the other ingredients; too much of the former gives a quiet and prolonged sleep but also the danger of circulatory collapse during treatment and of excitement on awakening. If the other group is dominant, the patient goes to sleep quickly but the sleep is brief and less stable so that frequent repetition of the drug is necessary and the volume of solution required is too large.

* Authorized report of a communication to the *Feitschrift für die gesamente Neurologie und Psychiatrie* (150: 146-162; 1934) prepared by Archibald J. Kilgour (Burghölzli).

The standard mixture makes a clear solution with 10 times its volume of water which is the dilution recommended for use. Instead of water, 4 per cent glucose to which $NaHCO_3$, gm. 1 to the liter, has been added, is used. A salt solution, NaCl, gm. 5 to the liter, may be used instead of the glucose. In the dilution indicated, the mixture, given rectally, produces no bowel irritation and sleep occurs within 15 to 30 minutes.

0.15 ccm. per kilo. body weight, of the standard solution, is the usual amount required to produce sleep. As much as 0.30 ccm. per kilo. may be given but is never necessary as 0.22 ccm. per kilo. serves to put even excited patients to sleep.

Owing to the difficulty in always obtaining ingredients of the same standard the manufacture of the whole preparation has been turned over to the firm of Hoffmann-La Roche u. Co., Basel, who supply it in packages of 200 ccm., a sufficient quantity for a sleep treatment of 8 to 10 days.

Maier, professor of psychiatry, University of Zürich, and director of the Burghölzli hospital deals with the clinical aspect. He attributes much of the lack of success met with by some workers in the use of somnifen and other barbiturates, to the neglect in carrying out the proper technique, improper selection of cases, and neglecting to make good use of the period immediately after wakening, for psychotherapy. Physically very weak patients and those with tuberculosis, liver, kidney, metabolism diseases and marked anomalies of the circulation are unsuitable for this treatment. During menstruation it is avoided because at that time the inclination to elevation of temperature and collapse conditions is increased. Paranoid schizophrenics and those with outspoken defect conditions are unfavorable.

The best prognosis appears to be in the following: acute attacks of catatonic and hebephrenic form, in which, after some weeks observation in hospital, it appears that the exacerbation (Schube) has worn itself out, but the patients are unable to find rapport with the environment and in consequence, inclination to automatic action (motor excitement, negativism, dissociation with or without sense deceptions) remains in action. In such cases the sleep treatment is able to break up the vicious cycle. Favorable also are those cases with strong manic or depressive components in the symptom picture provided that chronic catatonic symptoms are not in the

foreground. This is particularly true of those cases which in the beginning have a periodic course and then the exacerbations become longer and there is danger of transference into a chronic end stage. Occasionally success is met with in acutely excited cases by giving the treatment early (within the first few days or weeks) but failure also occurs. In any event no harm is done in such cases.

The technique is as follows: No nourishment or fluids are given by mouth during the treatment which is begun when the patient is in a well-nourished state. Patients that have been tube-fed are avoided but when this is not possible then for several weeks before, the feedings should contain vegetable preparations as well as the usual ingredients.

A quiet darkened room where day and night nursing is available is required.

The bowel is thoroughly cleansed with a high enema the evening before treatment is begun.

On the morning of the first treatment day 0.15 ccm. per kilo. body weight (about 7.5 to 10 ccm.) of the standard solution diluted with 10 times its volume of 4 per cent glucose is given by rectum. This produces sleep in 15 to 30 minutes. The narcotic is repeated when it is noticed that the patient is becoming restless or the sleep is lighter, but in decreased amount, even to one half of the first dose.

It is important that the patient receives plenty of fluid. Experience has shown that the toxic effect of the drug mixture is increased if the body is deprived of water. Therefore, every three or four hours, day and night, 400 ccm. 5 per cent glucose is given rectally by Murphy drip method. Once in 24 hours this is replaced by the same amount of normal saline. The patient, thus, in 24 hours, receives 2000 to 3000 ccm. of fluid.

In the first three days, 3 or 4 repetitions of the narcotic mixture are required but after that, probably only 2 in 24 hours.

Temperature, pulse, breathing, bowel and bladder evacuation require close observation. Temperature elevation up to 37.5 C. (per axilla) is without dangerous significance. If it goes higher it is frequently found that the fluid intake and diuresis is insufficient (because of escape of part of the fluid from the bowel, for instance). Normal saline given subcutaneously often overcomes this. If temperature goes still higher it is an indication for the interruption of the treatment.

Catheterization may be necessary and if the bowels do not move over a two day period this must be encouraged by peristalsis injection or oil enema.

If pulse becomes irregular or weak and yet no other danger sign appears, strophanthin $\frac{1}{4}$ to $\frac{1}{2}$ mg. or, intravenously, a concentrated solution of glucose (20 to 40 per cent). Coramine and similar drugs are to be avoided if the treatment is not to be interrupted because they decrease the depth of the sleep. In cases of collapse oxygen inhalations meet with rapid success.

The narcosis is carried out for a period of 8 to 12 days. When the drug mixture is withheld the patient gradually wakes up in one or two days time.

The period immediately after waking up is very important for psychotherapy. A special nurse who can work along with the physician throughout the whole day should be allotted to the patient. The latter should be in a pleasant orderly environment, receive visits from relatives and be discharged home as soon as possible, within two weeks at the most if the treatment has met with success. The intervening days in hospital should be full of variety. No attempt should be made to discuss the details of the previous sickness.

One hundred and sixty cases of schizophrenia have been treated in this manner at the Burghölzli clinic during a four-year period. The conclusion is reached that the "prolonged narcosis treatment," using "Cloetta Mixture," in the manner described, is an essential improvement on other forms and definitely diminishes the dangers.

Because of the necessity for constant nursing and medical attention it is not considered a safe procedure for use in general practice. The inclusion of digalen and ephedrine has almost done away with the occurrence of circulatory disturbances which in earlier methods so frequently caused the interruption of treatment. The danger of aspiration pneumonia has been completely eliminated.

Résumés of three histories, with comments on the results, are given; also a copy of a typical nursing chart as used at Burghölzli. There is no analysis of the results in the whole group treated.

JUVENILE PARETIC NEUROSYPHILIS STUDIES.

VII. The Descriptive Mental Picture.

By WILLIAM C. MENNINGER, M.D.*

In previous studies, the incidence, sex and age at onset, the family and developmental history, and the physical findings in juvenile paretic neurosyphilis have been reported. The present study is concerned with the delineation of the descriptive mental picture. The material for this report consists of 43 personally studied cases and 610 cases reported in the literature.

In the preceding reports, the statistical method was used. However, such a method is inadequate for a description of the mental picture. It is unsatisfactory because of a lack of uniformity of nomenclature, and interpretations given to psychiatric symptoms. Except for such specific symptoms as hallucinations, particular types of delusions, specific emotional reactions and volitional disturbances, it is not possible to categorically classify symptoms in a statistical form. Much of the classification attempted is of necessity my own interpretation of the mental picture as reported by the various writers. Consequently, the mental picture here presented is based largely upon my own observations. A review of the literature aids in throwing some light on the frequency of specific mental symptoms such as hallucinations, grandiose delusions, types of misconduct, etc.

The Mental Picture in the Early Stage.

The mental picture in the early stage depends largely on the mentality of the child at the onset of the disease. Approximately 40 per cent of all cases of juvenile paresis are feebleminded, and so the mental picture is colored primarily by the hypophrenia. In the remaining 60 per cent of cases with normal mental development, the picture is more varied, with a much more frequent development of hallucinations, delusions and other typically psychotic symptoms.

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The typical mental picture of juvenile paresis is one of confusion, mental regression to dementia, inadequate emotional response, and a restless purposeless behavior, often characterized by untidiness and misconduct. In the cases appearing on a feebleminded foundation, this is nearly always the picture, and one rarely finds well developed delusions of reference or expansiveness. Even though feebleminded, the patient regresses mentally, to lose what achievements he may have acquired.

Typically, the group of cases with normal mental development progresses rapidly to the picture described above, *i. e.*, a cross-section mental picture, indistinguishable from the basically hypophrenic type of case. And even early in the disease process, in cases of normal development, the symptoms of mental regression, confusion, inappropriate and inadequate emotional response are usually conspicuous. It is, however, in this group that hallucinatory experiences and definite delusions are more frequent, and the emotional tone fluctuates more often and more widely than in the feebleminded cases.

The Mental Picture in the Late Stage.

Regardless of the mental development, all cases usually reach a very similar stage, and it is impossible to judge from an examination what the mental development may have been prior to the illness. There is a rapid mental regression in all fields so that the case presents extreme dementia, responding to no questions and often to no external stimulus except pain. They lose all interest in the environment, and become vegetative, requiring spoon or even tube feeding and bed care, being entirely oblivious to all bodily functions. The typical picture in a terminal stage is a mute, untidy, emaciated child, lying in bed in an intra-uterine position, with marked contractures of both legs and often arms, and responding to no stimuli except pain.

Types of Mental Reactions.

The clinical mental pictures of juvenile paresis defy classification into various types, so characteristic of the adult form. It is not possible for various reasons: typically the emotional response is extremely varied and oscillates widely, even in the same patient; the

immature intellectual development of the individual largely precludes wide variation so that various types of delusions and judgment defects are in miniature as compared with adult cases; the child regresses so quickly, that the partial loss of intellectual achievements, such as calculation and general knowledge, seems less striking and conspicuous than in acquired paresis.

Other writers have called special attention to the fact that the mental reaction types in juvenile paresis are not clear cut. All agree to only one well defined reaction: the simple dementia (Kraepelin). Klauder and Solomon [11] include an agitated type and in addition to these two forms Schmidt-Kraepelin [16] includes a rather rare picture of depression. It seems to me unsatisfactory, if not impossible, to make any other clearly defined group in addition to the simple demented variety. Agitation does occur rather frequently, but usually periodically, and very often even in the demented form. Excited periods are reported to have occurred in 23.6 per cent of the 653 cases, and in more than a third of my own series of 43 cases. Likewise depression, while less frequent, occurred at some time in the history or while under observation in 8.5 per cent of all the cases. However, a case that may be depressed at one time, may show euphoria at another time, and it is exceedingly rare that a case is chronically depressed or even approaches the depressed type of mental reaction seen in the adult form.

Consequently it seems possible to delineate only one consistent mental type, namely, simple deterioration. In the 60 per cent of cases occurring in children with normal mental development, the early mental picture may occasionally be characterized by agitation, or expansive delusions and euphoria, or depression. Very rarely does any one of these symptoms predominate over a considerable length of time. As will be pointed out later a rather typical schizophrenic picture is occasionally seen.

Perception.

Perceptual disturbances were regarded by Idrac [10] as the most important difference between the juvenile and adult forms of paresis. It is not clear whether he included delusions as a perceptual disorder. In any event the disturbances of perception, other than confusion, are not conspicuous in the juvenile type. In 397 cases

(60.7 per cent) of the total of 653 in the series, there was no mention of any perceptual disorder. Confusion, along with partial or complete disorientation is recorded in 196 cases (30 per cent). Auditory hallucinations were present in 33 cases (5 per cent) and visual hallucinations in 36 cases (5.5 per cent).

Confusion.—As has been indicated above, confusion was present in 30 per cent of all cases. This includes both recent memory disturbances and disorientation. As judged by my own cases, some perceptual disturbance is present in the great majority, even in the early stage. The ability to perceive and respond with any appropriate sign of understanding fades as the disease advances, so that at a late stage, perceptual disturbances and particularly the picture of confusion and complete disorientation is always present. Consequently the actual incidence of confusion as recorded in this study is incorrect and can only be interpreted as indicating the incidence in a large group of cases at various stages of the disease. In every case in my own series in which mental regression was advanced, the confusion was proportionate to the amount of regression; in 25 cases it was conspicuous. In 21 cases of my series there was partial or complete disorientation to person, time and place; 4 were questionably partially disoriented, and in 18 cases, there was no gross disturbance in the orientation.

In the early stage of the disease, the child may be clear as to the people around him, his ideas of time and understanding of his location. This again depends on the basic mental state, *i. e.*, whether or not he may have been feebleminded since birth. However, he soon loses his grasp of the situation and becomes slightly confused. Recent memory becomes distorted early. As the disease progresses, the confusion increases and perceptual acuity diminishes. He may maintain an interest in his toys, later in miscellaneous material he may pick up—string, sticks and trinkets. He may manifest an interest in objects presented by the examiner such as a watch, bright pencil, any colorful or bright object. He may indicate an understanding of simple questions, even after his ability to correctly or understandingly answer them has disappeared. Later he pays little attention to the physician or nurse, perhaps giving no indication of recognition, or at most a slight change of facial expression; possibly slight attention to sounds, or fear at unexpected noise. After becoming bed-ridden, and occasionally before, he may only respond

by blinking of the eyes, and later fail to respond to any sort of stimulus short of pain. At such a stage, he may fail to make a response to any visual or auditory stimulus, becoming entirely mute and vegetative.

An example of confusion, associated with hallucinations is shown in the following case:

CASE 18.*—A male, aged 25, whose paternal relatives showed many instances of psychoses and epilepsy. The maternal grandmother was alcoholic, and the mother was committed to an institution as a psychopathic personality and presented clinical but no laboratory evidence of neurosyphilis. The patient had a convulsion at one year, two convulsions when 11, and then at frequent intervals following his 16th birthday. He went to school from the age of six until he was 14, attending high school two years, but passing in only two subjects in that time. He then worked at various jobs, but made a poor adjustment. At 19 years of age, he had a series of convulsions, followed by a stupor which lasted for two days with visual hallucinations. A similar attack occurred at 23 years of age. At 25 he developed a gastric crisis-like attack, and several convulsions. He became acutely confused, ran about the room, stared at the ceiling, talked of receiving a message, shouted to unseen persons out of the window, and finally locked his door and climbed out of this window. He was taken to the hospital, screaming, fighting and resistive.

Physically he was well developed; blood pressure 140/110. *Neurological* examination showed increased reflexes, some gait disturbance, and speech difficulty, but no pupillary changes. *Stigmata:* none apparent. *Mentally* he improved shortly after admission, became coherent and relevant in his conversation, but was still somewhat confused, apathetic, mildly depressed, dulled and sluggish as to emotional response, and had a greatly reduced spontaneity. *Laboratory* findings showed positive Wassermann test in blood and spinal fluid, normal globulin, and one cell.

Course: a course in malaria did not change either the mental picture or the frequency of convulsions. During the malaria, he was very resistive and combative.

Hallucinations.—Auditory hallucinations are reported to have occurred in 33 cases and visual hallucinations in 36 cases. In my own series, six cases showed auditory and only one case visual hallucinations. In general, the hallucinations in juvenile paresis are less vivid, perhaps less well described by the patient, and seem more transient in character than in the acquired type of paresis. In four of my six cases, the hallucinatory experience was very brief, lasting only a few days; in one case the patient heard God's voice; in a

* Cases 1 to 17 reported in the previous studies of this series.

second, messages were received from unseen people; in a third, a married woman heard voices saying that her husband wanted her to die; one patient had both auditory and visual hallucinations of persecution. In the other two cases, the hallucinations persisted over some months: in one, God's voice conversed with him and the other heard boys talking about him and calling him "bad" names.

Many writers mention the occurrence of hallucinations, but the majority associate them with delusions. Dahl [5] reports them in 14 of 164 collected cases. Klieneberger [12] did not find any cases with hallucinations. Schmidt-Kraepelin [16] states that they are very rare. She refers to them as "illusions" and reports them as having occurred in three cases—in two additional cases, upon questioning, the patients stated that they heard voices. Fairbanks [6] illustrates some types of hallucinations, both visual and auditory.

Tactile hallucinations are reported very rarely. In two of my own cases, the patients believed that electricity was playing over their bodies and they described the sensations of prickling and movement. In two of Schmidt-Kraepelin's [16] cases, there was a similar condition.

Intellection.

The most conspicuous part of the mental picture of juvenile paresis is the intellectual regression, which occurs in every case as the disease progresses. It was apparent and specifically indicated in 90 per cent of the reported cases. Its absence in the reports of the remainder of the cases is probably only an omission on the part of the writer. This regression is a progressive feature and even in the basically feebleminded cases, the child loses his ability to function in whatever achievements he may have previously acquired. It is primarily a quantitative defect and is very similar to the simple demented type of acquired paresis. Regression usually takes place from whatever mental age the child may have reached, to an infantile mental picture below measurement by any intelligence test.

An example of this childish picture of regression in the normally developed child is illustrated in the following case:

Case 19.—A female, aged 11 on admission. Patient's mother was in poor health and the maternal aunt was insane. There were three other children who died under a year of age, one still-birth and one miscarriage. The pa-

tient developed normally, was bright and finished the third grade in the public school. During the summer of her ninth year she had a tonsillectomy and first began to show memory defects and chattering speech. In her 10th year she developed ataxia and would fall at times. She became stubborn and developed insomnia. Syphilis was discovered and she was given 30 arsphenamine injections without change in her condition.

Physically she showed a fair development but with syphilides over the buttocks. *Neurologically* she showed unequal, completely fixed pupils, a speech defect, a tremor of her tongue and fingers, markedly increased reflexes, a positive Romberg, and a markedly ataxic gait. *Stigmata* included Hutchinson's teeth, snuffles and syphilitic sores about the nostrils. *Mentally* she regressed to an apathetic, resistive, untidy child who soiled herself frequently. She was mute except to cry. She had numerous mannerisms such as picking her nose, jumping up and down on the bed. She presented no delusions or hallucinations. *Laboratory Findings* showed a positive blood and spinal fluid Wassermann test, marked increase of globulin and 71 cells.

Course: despite arsphenamine and mercury she showed no change in eight months and was paroled against advice to her family.

Delusions.—Paranoid delusions are reported in 28 cases (4.3 per cent); expansive or grandiose are reported in 62 cases (9.5 per cent); other delusions (chiefly somatic) in 34 cases (5.2 per cent).

Paranoid delusions are rare, although in my own series, 11 cases presented either definitely persecutory delusions or ideas of reference. This type is specially mentioned by Stewart,[17] Arsimoles [1] and Halberstadt, and Briand and Brissot.[3] In my own cases, one thought that negroes were after him and he accused the neighbors of stealing his clothes; one believed that detectives were in search of him; Case 18, reported above, thought that he was being persecuted and climbed out of the window; one believed that people were taking his money and clothes; one thought he was being persecuted by the other patients and ward attendants; another believed that he was being mutilated; another talked of being bewitched.

Two cases showing these paranoid trends in detail, are abstracted as follows:

CASE 20.—Male, aged 18. The mother was known to have syphilis. He was a "delicate" child. By nine years of age he had reached the fourth grade in school, and from then until 16 he was in an ungraded room. About the age of nine he began to grow dull, brooded and became seclusive. He cried, especially at examination periods. From the age of 9 until 18, antiluetic treatment was given regularly but he seemed to grow worse. He became excited and resistive and talked of having to fight soldiers who were attacking him. He said he was afraid.

Physically he was under-developed. *Neurologically* he showed irregular, unequal and completely fixed pupils, a tremor of the tongue, slurred speech and moderately increased deep reflexes. *Stigmata:* frontal bossae, adiposo-genital dystrophy with under-developed genitals and poorly developed teeth. *Mentally* he was talkative, childish, irrelevant and incoherent. He was often restless and expressed the idea that he was being poisoned and that people were after him. At times he was noisy, striking his face with his fist, and he practiced masturbation openly. Mental age: five years and six months. *Laboratory Findings* showed a positive blood and spinal fluid Wassermann; increased globulin; 5 cells; colloidal gold curve 3444432100.

Course: he was given 11 chills of malaria without improvement. He was sullen and disinterested and untidy. With continued tryparsamide, he improved slightly, willing to work but extremely shallow and childish. He would stuff his clothes with papers and useless articles.

CASE 21.—Colored female, aged 20. Paternal grandfather was in an insane asylum. Patient had apparently developed normally and graduated from high school. She married at 16 years of age. She had one child each year for the next four years, none of whom could be examined. Her present illness began at 17 when her alcoholic husband began to mistreat her. She developed a speech defect and began to regress mentally. She became acutely excited and had to be hospitalized.

Physical examination showed a good development but with large inguinal glands. *Neurological* examination showed sluggish pupils, slurred speech, incoordination, a positive Romberg, absent knee jerks and diminished ankle jerks. She was hypersensitive to touch and pain. *Mentally* she showed an exaggerated euphoria, was disoriented and had marked memory defects. She heard voices saying that her husband wanted her to die, and believed that he was trying to shoot and poison her. She felt electricity playing over her body. *Laboratory Findings:* blood specimen was never taken and repeated attempts for a lumbar puncture were unsuccessful.

Course: the patient lived only one week after coming to the hospital. She became acutely agitated and developed convulsions, stupor was followed by death.

Expansive delusions are reported in 62 instances (9.5 per cent) in the series of 653 cases, although in only two of my own cases. The frequency of delusions of grandeur has been variously reported by different writers. Rosenheck [14] states that they are entirely absent; Bunker [4] reports them as rarely present; Fairbanks [6] comments that they are "very rare." Despite these opinions, this study indicates that they are frequently present. It is generally agreed that they are puerile in type, being proportionate to the age and intellectual background. Only rarely are they extremely expansive and comparable to the similar type seen in the adult form of paresis.

Hautrive et al [8] reports a case in which the child talked about flying the Atlantic, being a millionaire, owning a cathedral; Rutherford [15] described a case in which the boy, aged 10, talked incessantly about flying to America with 100 airplanes and issuing invitations to take a trip in his houseboat; Babonneix [2] collected a group of 100 cases in which he found 12 or 14 per cent showing "petites idées de grandeur."

As pointed out by Schmidt-Kraepelin,[16] many of the patients are inclined to braggadocio and probably prevarication. They become exceedingly boastful of their prowess and ability, and they fabricate fantastic experiences. Rarely do these actually surpass the possibility of reality, yet they are quite beyond the reach of the patient; consequently they represent, in many instances, the juvenile type of expansive delusion comparable to the adult form.

Rather pronounced grandiose delusions are shown in the following case:

CASE 22.—Female, aged 17, whose father was paretic and whose mother was known to have a positive blood Wassermann. The patient had a hydrocephalus at six weeks, following a fall, with rhinorrhea and ear drainage. She walked at two years and talked at three years. At eight years she began to lose her eyesight, which however improved with anti-syphilitic therapy. She finished four grades of school by her 15th year. She stole some goods and was placed in a training school from which she ran away twice. At 15 years of age she married and shortly gave birth to a child. At 15 she was examined in the juvenile court, found to have a mental age of nine years and was sent to a hospital, where a diagnosis of juvenile paresis was made. About this time she developed convulsions. She tried to buy some merchandise without money and was committed.

Physically she was well nourished and developed. *Neurologically* she showed dilated, unequal, fixed pupils, unequal hyper-active deep reflexes, a speech defect, a slight tremor of the fingers, tongue and mouth and choreic movements of the left shoulder and thigh. *Stigmata:* mal-formed teeth; pigmented scars over her body. *Mentally* she was oriented and conversed relevantly and coherently, but she was childish and somewhat confused and unreliable in her statements. She insisted that she had lots of money and demanded that many things be purchased for her.

Course: she was given six doses of tryparsamide and a total of four grams of sulpharsphenamine. This was followed by malaria, following which her convulsions (previously present) ceased, and she seemed more quiet. She improved sufficiently to be paroled, apparently in a stage of partial remission.

Memory Loss.—Memory loss is frequent. It was indicated as present in some degree in 66 per cent of the 653 cases, and is in proportion to the mental disintegration. Schmidt-Kraepelin [16] states that some " seem very forgetful and to think poorly and they repeat themselves frequently in oral and written statements." On the other hand, Fairbanks [6] calls attention to the fact that in occasional instances, rote memory is preserved to a remarkable degree. In his own case, five months before death, at a period when all the other signs of dementia were well marked, the boy recited " Barbara Frietchie " with only two or three mistakes, which he recognized and corrected himself. Fugue states are reported in the cases of Streitberger [18] (1894) and Barbé and Lévy-Volenski [18] (1912).

Hypochondriasis.—Hypochondrial complaints were reported in only 13 instances, though in about 20 additional cases, hypochondrial delusions were noted. These complaints are of particular interest in presenting rather typical neurotic mechanisms in the disease, despite both the dementia and the organic disease process. The delusions were typical somatic delusions: " head made of wood," " no blood," " organs rotting away," etc.

Mental Age.—The mental age and intelligence quotient are given in a good many cases; notably those of Schmidt-Kraepelin,[16] Klauder and Solomon [11] and in 13 of my own cases. These intelligence measurements are of interest in the individual case, but of no significance in the review of a series of cases, as in this study. The child typically shows a progressive lowering of the mental age as the disease progresses. Simple calculation tests, memory spans, investigation of the general fund of information, and other simple ungraded intelligence tests all show the expected defects, in proportion to the regression. At most, the results of such tests, only indicate the *pro tem* status of the patient.

Schizophrenic Mental Pictures are reported by several writers and occurred in one of my own cases. Huguet [9] (1913) took the extreme view that many early schizophrenic cases might be cases of juvenile paresis. In some of these cases, the mutism, cataleptic postures, and motor catatonic states resemble schizophrenia, but in the majority of such pictures the behavior is largely accountable to the regression of the mental state. Schizophrenic mental pictures were reported in the cases of Eisath [18] (1905), Millard [18] (1912), Botelho [18] (1919), Hautrive et al [8] (1928) and Crohn [18] (1932).

In Hautrive's case, the patient was at first schizophrenic and then became extremely grandiose. He was given malaria treatment and the grandiose ideas were again replaced by stereotypy, negativism and other schizophrenic symptoms.

Emotional Disturbances.

Inadequate Response.—No one descriptive word applies to even a bare majority of juvenile paretics in characterizing the emotional response. The majority are, however, inadequate, dulled, "flattened" and often silly and extremely childish. Nearly every case becomes so in an advanced stage of the disease. Their interests become limited and regress to nihil. Their attachments to people fade to complete apathy. The emotional tone may fluctuate between irritability and excited periods, between euphoria and depression, but the constant and most consistent longitudinal section picture is a hebephrenic inadequacy.

Euphoria.—A very small percentage of juvenile paretic cases are constantly and consistently euphoric, but many of them show transient periods of gaiety or euphoria. A transient elated state is reported in 115 cases (17.6 per cent) of the 653 reviewed. The euphoria is mild compared with the similar picture in the adult, and is not always evident in all cases showing expansive delusions. Most often it is relatively short in duration, and commonly intermixed with irritability and agitated periods. It is illustrated by the following case:

Case 23.—Male, aged 18. The father had syphilis and a year prior to the patient's admission, had an hypochondriacal anxiety episode. The patient never grew to normal development, but attended school until he was 16, finishing two years of high school, always doing mediocre or poor work. He worked as a messenger until hospitalized. At 15 years, he began complaining of visual difficulties, and at 17 a positive Wassermann was first noted. He began to fabricate tales and carry on queer activities, such as riding the subway all night. He became ataxic, developed a speech disturbance and headaches.

Physically he was 27 pounds underweight, had a marked kyphosis, slight hydrocephalus and a bilateral choreo-retinitis. *Neurological findings* included irregular fixed pupils, ptosis of the left lid, external strabismus of the left eye, deviation of the tongue to the left, ataxic gait, absent knee jerks but exaggerated arm jerks and slurring speech. *Stigmata:* asymmetrical ears and face, feminine hair distribution, hypoplasia of the genitals, scaphoid

scapulae. *Mentally* he was oriented, accessible and cooperative; mildly euphoric without delusions. Mental age 14.8. *Laboratory:* positive serum Wassermann and positive spinal fluid in 0.5 cc., with 19 cells, increased globulin, and a gold curve 555543210.

Course: following nine malaria chills he seemed more quiet and settled, and for awhile his euphoria disappeared, and the serology in spinal fluid was positive with 1 cc. of fluid. He was paroled but had to be returned, presenting a cock-sure euphoric attitude, very talkative and active, although cooperative. He presented this mental picture over a period of several months.

Depression.—Depression is much less frequent than euphoria, having been reported at some time in the history or observation in 56 cases (8.6 per cent). Depression rarely continues over a long period of time, and yet is one of the three classes of reaction types noted by Schmidt-Kraepelin.[16] Like euphoria, it is usually a transient state, characterized more by moroseness and sluggishness than by depression and self-depreciatory ideas. Occasionally there is a mild anxiety, noted in 8 of 163 cases collected by Dahl [5] (including those of Fröhlich and Hirschl). Arsimoles [1] mentions that there is "occasionally a true melancholia," and suicidal attempts (associated with depression) are reported by Bravatta [18] (1906), Pianetta [18] (1910), Schlicht [18] (1915) and Hübner [18] (1917). A case showing a persistent depression, associated with suicidal attempts is illustrated in the following:

CASE 24.—A colored male, aged 20. The family history is not known. He had practically no education and had lived an erratic, alcoholic life, having been arrested and imprisoned. At the age of 18, while in prison, he talked of being bewitched, became extremely depressed and had to be tube fed. He attempted to cut his throat with a knife, and was transferred to the hospital.

Physically he showed average development, a stooped attitude with a slow and aimless gait. *Neurologically* he presented much increased reflexes and ataxic gait, but the pupils were unsatisfactorily examined. Slurring of speech. *Stigmata:* none noted. *Mental:* much of the time he appeared depressed, but did have periods of spontaneous laughter. He was always confused, gave no answer to most questions, and showed marked memory defects. He frequently acted erractically, often standing on his hands. He masturbated openly and was very untidy. *Laboratory:* data not given, but there was a history of syphilis, and there was no disagreement among several psychiatrists as to the diagnosis.

Course: despite treatment, he progressed to mutism, stereotypy, restlessness, and occasionally, destructiveness and combativeness. He died at the age of 24; the disease had lasted for at least six years.

Excited Periods.—Transient excited periods were reported in 154 cases of the total of 653 (23.6 per cent). Rosenheck [14] gained the impression that excitement was absent in the juvenile paretics, but it is frequent, usually interrupting periods of apathy. It is often associated with irritability (reported in 140 cases.) In the excited stage, the child may become destructive and not infrequently combative. In many cases, the excitement is less purposeful, such as stamping the feet, dancing, noise making and other forms of hyperactivity.

Phobias are rare. They were present in three cases in my own series, in each case associated with a persecutory delusion. As such they cannot be classed as true phobias, but fear was conspicuous in each case. They are also reported by Karpas [18] (1907), von Rad [18] (1908), Hough [18] (1909), Daneo [18] (1912), Targowla and Schiff-Werheimer [18] (1927).

Volitional Disorders.

The volitional disorders are a conspicuous part of the mental picture of juvenile paresis. Increased motor activity, particularly restlessness, is very common. As mentioned above, the excited periods are almost always characterized by excessive motor activity of some type. Many of the volitional disorders in this disease are seen in the normal infant and child, and only appear pathological because of the older age of the individual. In general, one may say that the behavior is often playful, purposeless, extremely simple, though in excited periods may become combative and destructive. Because of the intellectual defects, particularly judgment, the activities may become anti-social and so represent misconduct.

Misconduct.—In general, the misconduct may take one of four forms: unruly or resistive behavior, destructiveness, antisocial activities, and open masturbation.

Resistive behavior and combativeness in some form is reported in 177 cases of the total of 653 cases (27.1 per cent). The type of activity varies from simple persistent disobedience to apparent homocidal attacks. Fighting is rather common, and in three of my own cases this was the chief factor necessitating institutional care for the patient. Running away, assaulting people, in one case attacking his mother with a butcher knife, riding the subway all night,

throwing scissors at a younger brother, locking his room door and jumping out of the window, meddling—all are examples of misconduct of this type. Temper tantrums are a common type of resistive and combative behavior, illustrated by the following case:

CASE 25.—A male, aged 15 on admission. His father was a queer, stupid fellow, but no family information was obtained. The boy developed normally until 14, when mental impairment was first noted and he developed convulsions. After this he failed rapidly, developing memory defects, speech disturbance, psychomotor retardation, and delusions that he was being mutilated. He was often the subject of violent temper outbursts, kicking and screaming, and often attempted to assault his mother.

Physically he was poorly nourished and under-developed. *Neurological* findings showed unequal, irregular, dilated, sluggish pupils, tremor of the tongue and facial muscles, unsteady, shuffling gait, slurring speech and exaggerated deep reflexes. *Stigmata:* Hutchinson's teeth. *Mentally* he was the picture of dementia, with disorientation, defective memory, childish emotional response, and very resistive and uncooperative to any form of examination. *Laboratory:* no examination was made because of the short stay in the hospital.

Course: a few days after admission, the patient's father took him for a ride and refused to bring him back, with a subsequent court dismissal of the case.

Destructiveness has been occasionally recorded, being specifically noted in 24 cases in the entire series of 653. The child often tears his clothing or the bed clothing. In one of my cases, the child would sit for hours unraveling stockings and if not furnished with the stockings, she would unravel her own clothes. The paretic child is often unable to evaluate any type of property and destructiveness may result from bad judgment without any element of viciousness or special show of emotion.

Antisocial activities are recorded in many cases, although Ferguson and Critchley [7] state that all forms of conduct disorder are rare and that they do not take an antisocial form. Kleineberger,[12] from a study of his own cases and numerous cases in the literature, calls attention to the rarity of "criminal urges," and Schmidt-Kraepelin [16] regards most instances of antisocial conduct as being carried out without an understanding of the antisocial nature of the acts. This is probably true in the great majority of cases, and such behavior results from poor judgment and defective intelligence. Stealing was a conspicuous feature in four of my own cases, and cases described as kleptomaniacs have been reported by Regis and Anglade [18]

in 1906 and Lunn and Holmes [18] in 1907. In addition to my cases of stealing, three others carried on such antisocial activities as to result in arrest. Such an instance is illustrated by the extreme antisocial activity in the following case:

CASE 26.—A male, aged 20 on admission. The patient was one of seven children, three of whom died of unknown causes. No definite familial syphilis was known. The patient attended school until 17 years of age, finishing the seventh grade, after which he sold papers and gum, worked as a messenger, and then sold candy in a theater. When 19, he was struck by a brother with a piece of iron pipe, and the patient responded by throwing a pair of scissors at the brother, but struck a younger brother. The patient was arrested, taken to the juvenile court, here his mental deficiency was observed and he was sent to the hospital.

Physically he showed fair development. *Neurologically* he showed normally reactive pupils, speech defect, tremor of the face and fingers, and increased reflexes. *Stigmata:* facial asymmetry, high arched palate, and prominent frontal bossae. *Mentally* he was oriented, but unstable emotionally, often lacrimose or excited. He annoyed other patients but regarded himself as being persecuted. There were no other delusions and no hallucinations. He was extremely restless, untidy, and uncooperative. *Laboratory:* positive serum and spinal fluid Wassermann tests, 47 cells, and increased protein were the findings.

Course: he was given four Swift-Ellis treatments without effect. He was paroled by request but shortly returned. He became progressively more childish, troublesome, with a tendency to grandiose ideas, speaking of money he had in New York. He failed physically and mentally, required tube feeding, became mute, extremely untidy, and died at 24 years of age: duration of illness, 5 years.

Overt sexual practices are also relatively common, and are mentioned in 26 cases, the majority of which were instances of masturbation. This occurred in five of my own cases, all of whom made no attempt to conceal their activity.

Personal Habits and Mannerisms.—The personal habits of juvenile paretics depend largely on the mental age, and consequently become more infantile as the disease progresses. While untidiness in regard to excretory habits is mentioned as present in 283 cases of the 653 (43.3 per cent), this figure probably indicates the stage of the development of the disease. And likewise the methods of eating become more primitive as the disease progresses, often necessitating spoon feeding, and later, tube feeding. The patient occasionally retains the control and care of his excretory habits in an advanced

stage of the disease. Occasionally they make curious recognition of their untidiness, as in one of my advanced cases who often soiled himself, and at such times would usually keep repeating "get the dust pan," although he made practically no other statements.

Mannerisms are occasionally developed: dancing, jumping up and down on the bed, pulling at nose or ears, collecting waste and trinkets, grimacing, facial twitching of a voluntary type, stroking the hair, and similar sorts of activity have been developed in my own cases.

Catatonic Behavior.—This has been observed occasionally with negativism, mutism, automatism. As has been mentioned above, a certain number of cases show a typically catatonic schizophrenic picture, in which the motor activity is very conspicuous. Some, if not the majority, of such cases are the result of a very advanced mental regression rather than a true catatonia. Automatism is reported in 18 cases, catatonia in 11 cases, and mutism in 42 cases. All of these symptoms occurred in a much larger percentage of my own cases than is reported in the large series reviewed. A catatonic, negativistic, mute case in excellent physical health is illustrated in the following record:

CASE 27.—A male, aged 18 on admission. The paternal uncle killed himself, the father had intestinal tuberculosis, and the mother was nervous. He was the youngest of 12 children, nine of whom were living. He developed slowly, and only reached the fourth year of school by his 15th year of age. He worked a year as a water boy, but was laid off on account of a tendency to fall. His illness became apparent at 16, with a convulsion, after which he was irritable and hard to manage. He was discovered to be openly masturbating and was sent to a hospital for eight weeks and was returned home, restless, fearful and irritable. He accused neighbors of stealing his clothes and thought negroes were after him. He refused to eat and was brought back to the hospital.

Physically he was undersize and underweight. His genitals were underdeveloped. *Neurological* examination showed regular, unequal, fixed pupils, greatly increased knee jerks but normal ankle jerks, and an internal strabismus of the right eye. *Stigmata:* in addition to the under-developed genitals, he was pot-bellied, presented frontal bossae and roughened tibiæ. *Mentally* he would wander about the ward at times, and at other times, he would assume a fixed and rigid posture for long periods. He was negativistic and showed various mannerisms. At times he would talk rapidly and incoherently but never made an answer to a question. He was extremely untidy. *Laboratory* findings showed a positive serum and spinal fluid Wassermann test, 17 cells, and repeatedly, a paretic gold curve, 5555432100.

Course: he was treated with arsenicals over two years without a change. He was given malaria and had seven chills, without any apparent effect. He became more unsteady of gait, and entirely mute except for an occasional burst of two reiterated phrases: "son of a b—" and on soiling himself would keep repeating "get the dust pan." He became more untidy, had no interest except to stuff his pockets with debris. He had to be dressed and spoon fed. He continued to have convulsions occasionally. He received sulpharsphenamine weekly for two more years without effect. When I last saw him, he had been in the hospital five years, aged 23 years, and his illness had lasted seven years.

Sleep Disturbance.—As is so often seen in the acquired form of paresis, the excited juvenile paretic frequently shows insomnia. It is specifically mentioned in 28 cases and attacks of somnolence are reported in six cases (Ballet [18] 1892, Haushalter [18] 1897, Fairbanks [6] 1908, Mondor [18] 1909, Milian [18] 1912, Ricksher [18] 1918).

Summary and Conclusions.

1. The most typical mental picture seen in juvenile paretic neurosyphilis is characterized by confusion, mental regression to simple dementia, inadequate emotional response, and a restless purposeless behavior.

2. The only distinct clinical type of mental reaction is the simple deterioration. Very rarely are cases depressed or agitated or euphoric over a sufficiently long period of time to establish them as a clinical type of mental reaction.

3. Perceptual disturbances are not conspicuous in the early picture of juvenile paresis, though confusion is usually apparent in the advanced stage. Visual and auditory hallucinations are reported in about 5 per cent of the cases, and in general appear less vivid, less well described by the patient, and more transient in character than in the acquired form of the disease.

4. Intellectually, the child always regresses, and the progression to dementia is the most characteristic feature of the mental picture.

5. Delusions of some type are reported in 19 per cent of the 653 cases reviewed. Of this number, 9.5 per cent were expansive or grandiose, and 4.3 per cent were paranoid. The expansive delusions are puerile and usually in keeping with the mental (intellectual) development of the patient. The paranoid delusions may be well developed though rarely systematized.

6. Memory loss is a common finding, reported in 66 per cent of all cases, and is probably present in all cases in the advanced stage of the disease.

7. A schizophrenic picture, usually of a catatonic type is rarely reported.

8. Emotionally, the patient's response is inadequate and dulled. Euphoria, at some stage of the illness, is reported in 17.6 per cent of all cases, and depression in 8.6 per cent of all cases.

9. Excited periods, almost always of a transient character, were present in 23.6 per cent of cases. They are often associated with periods of irritability.

10. In the field of volitional activity, the outstanding symptom is restlessness. Misconduct, either as unruly or resistive behavior, destructiveness, antisocial activity, or masturbation, was reported in about 30 per cent of all cases. Some degree of untidiness is very frequently present, and is probably developed in every case in an advanced stage.

11. Catatonic behavior, with negativism, mutism and automatism is manifest in about 5 per cent of cases.

12. Sleep disturbance, either as insomnia or somnolence, is mentioned in only 4 per cent of cases, but probably occurs more frequently.

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CASE 22. CASE 27.

CASE 22.—Now aged 19 years; the patient had marked grandiose delusions. She has a child two years of age.

CASE 27.—Aged 23, now five years after admission. This patient presents a catatonic schizophrenic mental picture. Note the now fully-developed genitals; also the internal strabismus of the right eye.

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RETICULO-ENDOTHEL.

Its Status in Certain Psychoses.

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Orientation.

There is great controversy concerning the value of psychological and physiological elements in the so-called functional psychoses. It is, however, not our purpose to discuss the merits of one or another argument involved in the subject. We merely wish to present for consideration certain clinical experimental data obtained in the course of certain psychoses which are relative to physiological changes in a structure of the human constitution that we believe to belong to the system of defense of the individual, and which, in our opinion, may play an important rôle in psychosomatic manifestations. We refer to the reticulo-endothelial system.

In connection with this system the observation of Herzog is of interest. Herzog states that we meet quite frequently in pathological conditions engagements of the vascular endothel. The latter reflects upon the reticulo-endothel, which in turn he considers to be basic for the human constitution.

It was Aschoff who first emphasized the significance of the reticulo-endothel. Since then considerable work has accumulated. The subject is excellently brought out by Boerner-Patzelt, Goedel and Standenath who also give exhaustive literature on the problem. According to various investigators including those quoted, the reticulo-endothel is, as the name indicates, of cellular, fibrillar formation. It originates from undifferentiated mesenchymal cells, and is diffused through the human organism. It is found in lymphnodules, spleen, liver and thymus. Blood cells, vascular endothel of smaller vessels and, according to Hortega, microglia may be included in this system.

Outstanding features of the function of the reticulo-endothel which play an important rôle in the mechanism of defense of the individual are:

1. Ability to produce blood.
2. Ability to act as phagocyte.
3. Ability to retain electro-negative colloids.

Moreover this system participates in and influences the cholesterol metabolism (Landau, MacNee), the iron metabolism and hæmoglobin (Eppinger), is instrumental in the mechanism of water retention (Saxl, Donath), and has relation to the protein metabolism.

With reference to intracellular retention, the reticulo-endothelial system retains "anodic" dyes like carmin, metal colloids like colloidal silver, colloidal products of the intermediate metabolism, pigments and other biological colloids. Microorganisms are apparently treated like other biologicals (Goldman, Schilling, Rosenthal). By virtue of this quality and the phagocytic ability the reticulo-endothel may be considered as a "purifier" of the constitution.

It is of particular interest to follow up the rôle of the reticulo-endothel in physiological-pathological conditions which may have certain bearing upon the mental condition of the person.

Among others we like to refer to Benda who investigated the state of the reticulo-endothel in pregnancy. Benda has shown that during the first half of pregnancy the capillary endothel is unimpaired. In the second half, capillary permeability increases. In primapara this change is more frequent than in multipara. The impairment reaches its maximum in eclampsia when the reticulo-endothel is greatly damaged. In normal conditions the tissue is restored in the puerperal state.

Our investigation of a sufficient number of psychoses relative to pregnancy and childbirth has shown that the onset in the majority of psychoses takes place during the second half of pregnancy. In case a mental condition manifests itself in the early part of pregnancy there are definite toxic symptoms present, and evidence of capillary dystonia is demonstrable. In psychoses following childbirth there are often prodromal signs during the final stage of pregnancy. The onset of post-partum psychoses occurs between 1-14 days, most frequently following delivery or on the twelfth day, or at any rate during subinvolution. If the onset is later, there are prodromal signs during subinvolution. On the whole the incidence of the psychosis corresponds closely to the quoted findings of Benda with reference to pregnancy; which together with our findings seem to create a situation which calls for careful consideration.

Another contribution is the study of Fr. Meyer who showed hypofunction of the reticulo-endothelial system in schizophrenia and other psychoses.

We have found in an investigation concerning the cause of death in certain psychoses definite evidence of capillary toxicosis which involves most vital organs and leads to failure in regeneration of blood, and in some cases to great perturbation in blood distribution with fatal issue.

Experimental Data.

Reticulo-Endothel.—The present investigation concerns estimation of function of the reticulo-endothel in certain psychoses. All cases investigated were free from any demonstrable physical disease except for imbalance of the vegetative nervous system.

Among various clinical methods recommended for such investigation the most popular in use is the congo-red method, as outlined by Adler and Reimann (*Zeitschr. f. d. ges. exp. Med.*, Vol. 47, 1925), which is based upon the ability of the reticulo-endothel to retain certain dyes. The best recommended technique is that of photometry; however, in view of lack of such facilities we employed the colorimeter. We believe that careful manipulation of sera will give fairly reliable results.

The procedure is briefly the following: The patient is to be throughout the time that specimens of blood are taken, on a fasting stomach. Ten cc. of blood are taken from the cubital region. Sterile and perfectly dry tubes are used. Immediately 12 cc. of one per cent sterile aqueous solution of congo-red are injected.

Exactly four minutes and one hour after the injection 5 to 10 cc. of blood are taken in each instance. Again care ought to be taken to have the receptacles perfectly dry.

The blood specimens are vigorously centrifuged and care must be taken to obtain perfectly clear sera without any trace of hæmoglobin.

To the serum taken before the congo-red injection an equal amount of a standardized congo-red solution is added. The obtained mixture and the four-minute and one-hour specimens are colorimetrized, and the rate of concentration in both specimens recorded.

The congo-red index which expresses in percentage the volume of the dye present in the circulating blood is determined as follows:

$$\text{Index} = \frac{\text{1-hour congo-red concentration}}{\text{4-minute congo-red concentration}}$$

Rates of 50-70 per cent are considered normal. For convenience we give obtained indexes in rounded up numbers.

We obtained the following data:

CASE 1.—Diagnosis: manic-depressive psychosis, circular type. Female, age 31; asthenic type with masculine features. Strongly differentiated impulse and affect. Had her first attack of depression lasting one month following an injury. Had two more attacks of depression and excitement previous to admission. Since her admission for subsequent four years has had alternate depressive and manic attacks. Test taken in manic state.

Congo-red index 90 per cent.

CASE 2.—Diagnosis: dementia præcox, catatonic. Female; age 25. Hypoplastic individual. Compulsive neurotic. Admitted to the hospital in an acute state of excitement. Test done shortly after admission.

Congo-red index 90 per cent.

CASE 3.—Diagnosis: dementia præcox, paranoid. Female; age 36. Morphologically well developed with some indication of thyroid hyperactivity, of strong impulse and unstable affect. Developed mental symptoms during final stage of pregnancy, was paranoid and hallucinatory. In the hospital quite agitated and apprehensive in response to hallucinations. After delivery became inactive and withdrawn. Continued to hallucinate. Test done during the latter state.

Congo-red index 80 per cent.

CASE 4.—Diagnosis: involution melancholia. Female; age 48. Physique, no striking traits. Affect and impulse insecure. Has developed within six months previous to admission a typical involutional mental syndrome, and has remained in the same condition in the hospital. Test done during acute state of depression and agitation.

Congo-red index 85 per cent.

The following two cases have developed during their hospital residence intercurrent physical conditions. Congo-red test and blood volume was determined. In the first case (case 5) both tests were done at the onset of physical condition and in remission. In the second case (case 6) both tests were done before and after the physical illness:

CASE 5.—Diagnosis: dementia præcox, catatonic. Female; age 18. Immature and masculine in appearance. Suspected hypo-pituitary-ovarian condition. Insecure impulse and cool in affect. Has developed ideas of reference and persecution with transitory hallucinations. Admitted to hospital in a state of excitement which was followed by stupor. After about one year hospital residence she developed an acute intestinal condition which took a course similar to para-typhoid. Upon admission to medical ward patient had a fever of 103° F. and a white blood count of 4500 cells. Physical recovery followed by complete mental remission.

Congo-red index at time of onset of physical disease 85 per cent. Congo-red index after remission 70 per cent. Increase in blood volume 950 gms.

CASE 6.—Diagnosis: manic-depressive, manic. Female; age 29. Physique, no striking traits. Impulse insecure, affect ambivalent. Has been mentally ill for about one year previous to admission. Psycho-neurotic nature followed by ideas of persecution and excitement. In the hospital she remained in a continuous hyperkinetic state with transitory hallucinations for some 10 months when she developed pneumonia, tubercular in nature. At onset there was a fever of 104° F. and a white blood count of 7000 cells. She was considered recovered mentally after physical recovery.

Congo-red index during hyperkinetic state 95 per cent. Congo-red index following recovery 65 per cent. Increase in blood volume 1200 gms.

Treatment.—Considering the findings relative to the reticulo-endothelial system as seen in our study of psychoses with fatal issue and the present investigation, an experimental attempt was made to treat certain cases of schizophrenia and manic-depressive psychoses with an agent that would reactivate the reticulo-endothelial system in order to raise the constitutional defense.

Among remedies chosen was liver extract, for the reason that we observed following administration of the latter in anæmias the peripheral capillary flow to become accelerated and the form of capillaries to improve. We also considered the possibility that liver extract may possess detoxicating power.

We treated nine cases, all females, whose physical conditions including routine laboratory tests were negative. They were first and recent admissions whose psychoses were presumably of three-months to three-years duration. Their ages ranged from 28-39. No other treatment was given. They were classified as:

Definite and probable schizophrenias, paranoid and catatonic	7
Manic-depressive psychoses, depressed and mixed types	2

Treatment consisted in 20 intramuscular, daily injections of two c.c. (10 gms.) each of liver extract "Lilly."

Three cases of schizophrenia and one of manic-depressive psychosis have shown a complete remission. Two cases of schizophrenia have shown a remission of one and six months respectively. Three cases remained unimproved. Improvement was shown in some cases toward the end of the course, in others shortly after the course was completed. Physical improvement was noted with reference to secondary and hypochromic anæmias present in all cases treated. Peripheral capillary flow and form of capillaries have shown improvement. Patients had an average hospital residence of about six months, and were able to leave the hospital within three months of time treatment began. No ill effect was noted. They were observed for a period of one year.

It is rather doubtful if we can speak of a "control" in this investigation; but of nine other patients who showed about the same characteristics, and who received the usual hospital treatment, only one patient showed a remission after a residence of six months. The rest remained unimproved.

Comments and Conclusions.

The present investigation appears to have shown three points of interest.

First, definite hypofunction of the retciulo-endothelial system in certain cases of schizophrenia and manic-depressive psychoses was found. The question arises what significance, if any, it may have in the release of a psychosis. The answer is difficult. However, we shall attempt to analyze the situation from the angle of the total personality. It would seem that the concept of the latter has widened our psychiatrical horizon, since it calls for evaluation of the sum-total of the stato-dynamic forces of the individual instead of evaluation of a part function only, be it physiological or psychological. Moreover, this concept supplies us with a basis for investigation into the mechanism of human activity on true biological principals, namely to estimate the person from the angles of organism, function and environment. In doing so, we see that organism and function may be identified with the so-called constitution, while organism, function and environment will compose the total personality or "constitution" plus "experience." Under "experience" we understand all possible influences exercised

upon the constitution by extero- and intero-ceptive stimuli which construct, reflect, influence, modify and condition its synthesis and reactions. "Experience" will include all environmental data in conjunction with the elements of time and space, and comprise geographical, meteorological, alimentary conditions and disease.

These considerations suggest that the individual's evolution is rather complex. The elements of the total personality will be closely interwoven, and when organized will express themselves in a vicious cycle of functions where the primary is difficult to distinguish from the secondary, and cause hard to separate from effect. (Mendelsohn disputes the action of the heart to be primary, giving preference to the capillaries.)

The degree of adaptation and harmony of the individual will show up in the degree of unity of functions achieved, which in turn will express itself in the "wisdom of the personality," such as maintenance of its balance and auto-regulation of its functions. (Claude Bernard, Cannon, von Monakov.) The close interaction of various elements of the total personality, furthermore, suggests that disturbance of a function will reflect upon others, and may reach a point when auto-regulation can no more take place, with the consequence of failure in adaptation. A variety of such failure may express itself in a form that we call psychosis.

It is logical to think that for the release of such psychosis a "receptivity" of structure must exist or be created. There are many ways and means by which such receptivity of structure may be produced. It may be however, purely functional, bio-chemical in nature, and one way that it may be accomplished is, in our opinion, through damage to the reticulo-endothel. Impairment of the latter may be caused by toxic infectious, psychical and otherwise traumatic factors. (It seems safe to assume that multiple factors are at work.) Hereditary and congenital predisposition and disease may facilitate the system's breakdown under stress. The influence of disease however, may be reversible as will be seen later.

We may conclude therefore, that a hypofunction of the reticulo-endothel, as found in our cases, will result in disturbance of most important items of metabolism. Moreover, through capillary dystonia it may impair nutrition, secretion, detoxicating abilities and other functions of vital viscera and glands with resulting faulty

impregnation of the nervous tissue with necessary biologicals. Cerebral capillary dystonia for instance, in conjunction with otherwise damaged reticulo-endothel may result in prevention of sufficient access of oxygen to the neurone, or convey such endo-toxic elements which interfere with proper oxidation of carbohydrates and lactic acid in the nervous system. This will alter the proper colloidal state and metabolic rate of the neurone, upon which adequate receptivity, conductivity, association and expression of psychic energy seem to depend.

In connection with the above the observatoin of Quastel is of interest. He states: "Much yet has to be done . . . . experiment has yet to show disturbance in detoxicating processes of certain psychotic types . . . . but it is clear from experiment so far that any mechanism resulting in deficient carbohydrates and lactic acid oxidation in the nervous system may well play a part in the causation of disorders of functional activity of the nervous system." Hypofunction of the reticulo-endothel may be one of such mechanisms.

Second, it is well known that following intercurrent physical disease there may be a remission of a psychosis. In both cases quoted mental remission was accompanied by improvement in function of the reticulo-endothel which is shown in raise of congo-red index and increase in blood volume. Perhaps evaluation of these data is helped by consideration of the effect of malaria treatment in general paralysis, and the fact of amelioration of certain psychoses by influenza, as brought out by Menninger. Again some results are obtained by typhoid therapy in schizophrenia.

It is our observation that while amelioration of mental conditions may occur under various circumstances of intercurrent physical disease, it is striking that most commonly a remission should follow a physical state with a blood picture of leucopenia. This is also true of the above references in general. More specifically, Bunker found leucopenia in 30 out of 33 cases of general paralysis treated with malaria. On the other hand, Hinsie and Blalock, who estimated the leucocytes in cases of general paralysis treated with radiothermy have found invariably a leucocytosis associated with elevation of temperature. Our cases have shown a rather low white blood cell count with a fever of 103-104° F.

Since leucopenia is believed to be an outcome of action of negative-chemotaxic agents upon the blood cells, and a result of depressive action of the same agents upon blood producing centers (elements of reticulo-endothelial system) it is logical to think that while fever may be considered a reactivating agent for the reticulo-endothel, better results are obtained through combination of fever and products of microorganisms such as in malaria which may act as electro-negative colloids upon the reticulo-endothel. So far we referred to the abilities of the reticulo-endothel to produce blood and intracellular retention. The third ability to act as phagocyte has been shown by Bruetsch whose opinion we decidedly share. Bruetsch observes that the reactivation of the reticulo-endothel is one of the factors responsible for the remission in general paralysis treated with malaria. It produces phagocytes originating not only in the liver or spleen but in the capillary endothel of the brain.

If this is correct, it may suggest that among other things re-activation of the reticulo-endothel may reestablish neuro-humoral equilibrium and proper metabolism of the nervous tissue.

Third, we have the impression that exhaustive investigation and treatment are indicated and promising in the earliest stages of psychoses. For obvious reasons we can draw no definite conclusions from our experimental therapeutic attempt. However, improvement in the peripheral capillary flow following liver extract, increase in blood volume and improvement of function of the reticulo-endothel in general, following intercurrent physical disease would suggest the significance of the investigated system in psycho-somatic manifestations.

We conclude therefore, without belittling other methods of treatment, that proper colloidal treatment of the reticulo-endothel may be helpful in treatment of certain psychoses.

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Comment.

SALMON LECTURES, 1935.

In a series of three lectures Dr. William A. White, of Washington, D. C., Salmon Memorial Lecturer and recipient of the award for 1935 from the Salmon Committee for Psychiatry and Mental Hygiene of the New York Academy of Medicine, gave a well integrated summation of present-day psychiatric thought in the field of medicine and its implications in associated sciences.

In addition to members of The American Psychiatric Association and the American Neurological Society, invitations were extended to members of the judiciary, educators and social workers, many of whom attended the lectures.

The opening lecture was given April 12, at the New York Academy of Medicine and was entitled "Psychiatry as a Medical Specialty," in which Dr. White traced the growth of psychiatry from the turn of the century to the present day, and envisioned the possibilities of the future.

The second lecture, "The Social Significance of Psychiatry," given April 19, was a description of the conflict going on between present-day psychiatric thought and some of the older concepts in law, medicine and education, resulting in a slow but steady modification of outmoded methods of thinking.

The concluding lecture, April 26, "General Implications of Psychiatric Thought," was a broad and comprehensive summary of problems facing us today with a suggested solution through psychiatric methods of approach.

Dr. White's listeners were impressed with his comprehensive view of present-day problems, both in the psychiatric field and outside; his complete saturation with psychiatric knowledge and his prophetic view of the future development of psychiatry as an instrumentality of social advance.

At the conclusion of the third lecture, it was announced by Dr. C. Charles Burlingame, Chairman of the Salmon Committee for

Psychiatry and Mental Hygiene, that the committee had selected Dr. Samuel T. Orton, of New York, Past President of The American Psychiatric Association and Professor of Neurology and Neuro-Pathology at Columbia University, as the recipient of the award for 1936. Dr. Orton will give the Salmon Memorial Lectures in April, 1936.

MASSACHUSETTS RESEARCH PROJECTS.

It is very gratifying to record that the Rockefeller Foundation has recently made two grants to the Massachusetts Department of Mental Diseases for research purposes. In December, 1934, the Foundation made a grant of $41,100 to cover a three-year period of investigation. This work will be done under the direction of Dr. Abraham Myerson at the new laboratory building lately completed at the Boston State Hospital. Acceptance of the grant by the department was approved by the Governor and Council of Massachusetts and the work is already under way.

A second grant, to the amount of $26,000, was made by the Rockefeller Foundation to the department in January, 1935, for the analysis and publication of the statistical data compiled by the department under previous grants from the Rockefeller Foundation. These data cover 120,000 cases of mental disease and 10,000 cases of mental deficiency. It is expected that the work will cover a period of four or five years. We may feel assured that the detailed statistical study of so large a group by means of the most improved and refined methods of statistical analysis will furnish highly significant and valuable information. This work will be carried on under the direction of Dr. Neil A. Dayton, Director of Statistics for the Massachusetts Department of Mental Diseases.

A STATE GOVERNMENT AND PSYCHIATRY.

At this time when there is wide-spread discussion and growing concern in the question of the attitude of politics to state medicine as exemplified in the several state and provincial hospital services, it is very well worth while to note the words of the Governor of Massachusetts on the occasion of the appointment, as superin-

tendent of a state hospital, of a man with long years of training and richly varied psychiatric experience, calculated to reflect credit upon the service and to guarantee the well being of the wards of the state entrusted to his care.

Governor Curly said:

The selection of Dr. Arthur N. Ball by the trustees to be superintendent of the Northampton State Hospital is entirely in line with what I believe to be the only sensible policy in such highly specialized institutions as those within the jurisdiction of the State Department of Mental Diseases.

The care and treatment of the mentally ill is an exact science, which calls for highly trained and temperamentally equipped department and divisional officials. The work is difficult and the remuneration is seldom large, and I believe that those men who are giving their lives and talents to this important duty of our state government should be promoted from the ranks when opportunity for advancement presents itself. It is the constant adherence to this policy which has preserved the morale for which our Massachusetts Department of Mental Diseases is known the country over.

News and Notes.

ACADEMY OF PHYSICAL MEDICINE.—The annual meeting of the Academy of Physical Medicine will be held at the Claridge Hotel, Atlantic City, New Jersey, June 12 and 13, 1935. For further information address Arthur H. Ring, M. D., Secretary-Treasurer, Arlington, Mass.

SEVENTH INTERNATIONAL MEDICAL POST-GRADUATE CONGRESS.—The Tomarkin Foundation, organized under the auspices of the University of Brussels, announces that the Seventh International Medical Post-Graduate Congress will be held during the World-Exhibition from September 12 to 19, 1935, at the University of Brussels, under the supervision of the Faculty of Medicine, and from September 20 to October 2, 1935, at Spa. This Congress dealing with " diagnostic and therapeutic actualities " in all branches of medicine is being organized with the approval of the General Commissariat of the Government for the World-Exhibition.

For further particulars address the Secretary, Tomarkin Foundation, Faculty of Medicine, 97, rue aux Laines, Bruxelles, (Belgique).

NEW JERSEY NEURO-PSYCHIATRIC ASSOCIATION.—Information has been received of the organization of the New Jersey Neuro-Psychiatric Association. A preliminary meeting attended by 46 representatives of neurology and psychiatry throughout New Jersey was held in February of this year. At a second meeting, March 13, a constitution was adopted and officers were elected.

Article I of the Constitution states,—

That the purposes of this organization shall be to promote the science and practice of neuropsychiatry, and to maintain high professional standards in that field.

Physicians who have been graduated from reputable medical schools and whose practices are devoted largely or exclusively to neurology or psychiatry shall be eligible for membership in this organization.

The following officers were elected: President, Dr. Christopher C. Beling; vice-president, Dr. Marcus Curry; secretary, Dr. Lewis H. Loeser; assistant secretary, Dr. Henry A. Davidson; treasurer, Dr. Guy Payne.

RESIDENCIES IN PSYCHIATRY, CINCINNATI GENERAL HOSPITAL.—Announcement has been made that two assistant residencies in psychiatry are available at the Cincinnati General Hospital, open to physicians who have had a one year interneship in a class A hospital. The psychiatric service has a bed capacity of 65 and an admission rate of about 120 cases per month. It is intimately connected with the medical school of the University of Cincinnati.

These two appointments, which are for one year, occur respectively July 1, 1935, and January 1, 1936. Further information may be obtained from Dr. E. A. North, Director, Department of Psychiatry, Cincinnati General Hospital, Cincinnati, Ohio.

LETCHWORTH VILLAGE SUMMER SCHOOL.—A second session of the Letchworth Village Summer School for the Study of Mental Deficiency will be held under the auspices of the New York State Department of Mental Hygiene at Letchworth Village, Thiells, N. Y.

During this period a study of mental deficiency will be made through the various avenues of biological patterns, neuro-endocrinology, psychiatry, psychology and sociology. The aim is to stimulate more widespread interest in mental deficiency; to encourage medical students and graduates in the study of the many ramifications of the subject; to afford training toward clinical and research studies for qualified non-medical students; and to correlate the problems of mental deficiency with recent advances in allied biological and sociological sciences.

The session will be divided as follows:

A. July 1–July 13. Comparative Psychobiology.
B. July 15–July 20. Neurology-Endocrinology.
C. July 22–Aug. 3. Psychiatry.
D. Aug. 5–Aug. 11. Special Reports and Reviews.

The mornings of these periods will be devoted to clinical studies; the afternoons to lectures, demonstrations, round tables by leading investigators, and visits to other institutions. Among the latter are included:

(a) A panel discussion on the subject, "The Psychologist's Report; Its Place in the work of the Mental Hygiene or Psychiatric Clinic"—under the auspices of the Summer School Staff in cooperation with the Association of Consulting Psychologists.

(b) Visits to American Museum of Natural History (Studies in Phylogenesis); Carnegie Institution of Washington, Station for Experimental Evolution and Eugenics Record Office; Cornell Morphology Farm and Sing Sing Prison Classification Clinic.

Address communications to Dr. Charles S. Little, superintendent, Letchworth Village, Thiells, N. Y.

PROGRAM 1936 MEETING.—The Committee on Program wishes to hear at an early date from those who can contribute or recommend the contribution of papers suitable for the 1936 program. Studies from the laboratory are especially desired and other topics will be welcome. Eighteen titles are already under consideration and the committee will appreciate early information about others.

The committee are interested in pictures of hospital activities. We hope to have still better arrangements for showing them at St. Louis.

Scientific exhibits are particularly desired. Their display in the last three years has received much attention from attendants at the meeting.

Correspondence may be with Dr. Samuel W. Hamilton, Bloomingdale Hospital, White Plains, N. Y., Chairman, or with any member of the Committee on Program. Regarding exhibits, Dr. Walter L. Bruetsch also may be addressed.

DR. ARTHUR N. BALL HEADS NORTHAMPTON STATE HOSPITAL. Dr. Winfred Overholzer, Commissioner of the Department of Mental Diseases in Massachusetts, has announced the appointment of Dr. Arthur N. Ball, by the Board of Trustees of the Northampton State Hospital, as superintendent of that institution to succeed Dr. Edward W. Whitney who died recently.

Dr. Ball's professional history indicates the suitability of this appointment. Graduating from the medical department of the University of Pennsylvania in 1911, he served a year's internship at the Paterson (N. J.) General Hospital, after which he joined the staff of the Northampton State Hospital where he remained nine years, with the exception of 16 months in the United States Army Medical Corps. From 1921 to 1926 he was assistant superintendent of the Gardner State Colony; and in the latter year was transferred to the Department of Mental Diseases as assistant to the Commissioner. There followed a three-year period as chief executive officer of the Boston Psychopathic Hospital, after which Dr. Ball again became assistant to the Commissioner of Mental Diseases, in which capacity he served until the recent appointment. During his term at the State House he had charge for one and one-half years of the division for the examination of prisoners.

The Northampton State Hospital and the State of Massachusetts are to be congratulated upon a governmental policy which ensures the selection of men trained in the service and of demonstrated ability to assume the positions of highest authority and heaviest responsibility in the state hospital system.

Book Reviews.

AIDS TO PSYCHIATRY. By *W. S. Dawson.* (Baltimore: William Wood and Company.)

This is a very complete little handbook of psychiatry which touches only the highspots of the subject and does not go into detail nor give any case material. In the opening chapters we find, first, an historical résumé of the various conceptions of mental disorders, and then a brief survey of normal psychology, leading to a discussion of the three aspects of mind (cognition, affection, and conation). With this as a background, showing how disorders of cognition, affection, and conation are the basis of psychopathology, etiology in general and the theories of the neuroses in particular, are discussed. Then follows a description of the various neuroses, of the psychoses, of the toxic conditions, and of the organic brain diseases, concluding with a dogmatic but useful table of differential diagnosis.

In the second part of the book the subject of mental deficiency is dealt with, giving much unnecessary detail in the classification of types, but including a description of moral imbecility which coincides with one type of psychopathic personality.

In the third part, treatment, British lunacy laws, and history taking, and mental hygiene form the main topics. The rules for general treatment are well handled, but the discussion of psychotherapy is far from complete. The outline of history taking is comprehensive, and well planned, separating the mental status examination in a somewhat different manner than is usual in this country.

As a whole the book forms a well planned, useful index of psychiatry, more practical on the side of description and diagnosis than in its presentation of treatment.

RACHEL K. GUNDRY.

LEBERUNTERSUCHUNGEN BEI GEISTESKRANKEN. By *Ottar Lingjaerde,* Acta Psychiatrica et Neurologica Supplementum V. (Copenhagen: Levin and Munksgaard, 1934).

This monograph is of interest as it presents a Danish trend in psychiatry, especially a conception of schizophrenia, and is at the same time a sample of the research methods and technique in vogue in the Scandinavian countries, where all the minutest details are deemed necessary to be recorded—hence, a volume of 319 pages, a goodly portion of which is taken up with tables and charts.

Dementia præcox, according to Lingjaerde, is not a disease entity, but only a syndrome which may be caused by a variety of factors. There are, according

to the author, active and inactive phases during the course of the illness, the former are brought out probably by intensification of the underlying genetic factors, especially by somatic disturbances. This assumption is based on the fact that during the active phase there are pronounced somatic manifestations of the autonomic nature, such as lability of pulse and weight, gastro-intestinal and other visceral disturbances, while on the mental side there is stupor, catalepsy and amentia-like states. Such conditions, the author feels, cannot be explained satisfactorily unless one assumes the presence of a disturbance on the somatic level. The liver, being the center of the general metabolism, an organ which reacts to the most minute toxic influence is, therefore, necessarily the cause of the active phase and in some instances is also the prime factor of a psychosis. The result of such a conception of psychoses in general and schizophrenia in particular is this monograph which is taken up entirely with a disturbance of the liver function in various types of mental disorders including schizophrenia. However, one should mention here that the author is somewhat hazy in his conception of the active phase of a psychosis; sometimes it is a period during the psychosis, other times it is the entire psychosis. One also does not get a clear idea as to what the primary cause of schizophrenia is; the nearest one can think of is something akin to the Bleulerian view of an organic primary cause, though he does not mention Bleuler in the text or in the bibliography. Schizophrenia is sometimes essentially "a partial abiotrophy" but the liver is the center from which all psychoses emanate. Whatever one may think of the author's conception this piece of work is of interest, as the author had the benefit of advice of a number of outstanding Danish chemists, physiologists and internists, and since the laboratory study was carried out on hundreds of patients with many repetitions of the tests in individual cases. In the main the following problems were considered: (1) Is there evidence of disturbance in the liver function in schizophrenia occurring with such a frequency that would preclude the possibility of a chance combination? (2) Is this disturbance to be correlated with definite forms of schizophrenia or with a definite syndrome or phase of the disease process? (3) Are the signs of liver disturbance to be seen chiefly in schizophrenic psychoses or in other types of psychoses as well? (4) Can evidence of liver disturbance in schizophrenia be utilized as a diagnostic criterion for this group?

It will be impossible to go into details of the various laboratory methods and the results obtained. We can give here only some of the general findings and the conclusions reached by the author.

Repeated tests made in individual cases of schizophrenia tend to indicate, according to Lingjaerde, that the symptoms of liver disturbance occur chiefly during the active phase and especially in the so-called amential states and during the periods of loss of weight. Positive laboratory results were found in 80 per cent during the active phase and the author, therefore, feels that the element of coincidence or of casual complication can be excluded. In the inactive phase of the psychosis the findings, if considered statistically, do not deviate from the average norm. The author feels that urobilinuria in schizophrenia and in amentia is due to malnutrition and that the important

factor is the deficiency in carbohydrate intake, and to lesser extent due to vitamin deficiency, mineral lack, and deficiency in protein intake. He thinks that carbohydrate reduction causes ketonuria and urobilinuria, the latter occurring when the liver is unable to produce and store glycogen. He believes that certain products of the protein metabolism and toxins of enteric origin are capable of displacing glycogen from the liver even quicker than hunger. In the beginning of a catatonic state there are symptoms indicative of a state of sympathicotonia and which is to be explained by an overflow of the adrenals leading to an increased glycogenolysis with a consequent increase in the carbohydrate demand. He thinks it is possible that the increased urobilinuria may be of hormonal and vegetative origin in schizophrenia as well as in other psychoses. The requirements for carbohydrate seem to be considerably increased during the active phases of schizophrenia and are much greater than in normal people.

During periods of reduced nutrition he found in a number of cases along with increased urobilinuria and ketonuria other signs of liver disturbance, especially positive Hay reaction, hyperbilirubinæmia and pathologic bromsulfalein retention. However, he adds that there are other factors besides malnutrition which may play a part in the pathogenesis of liver disturbance as he had seen cases with urobilinuria in a good state of nutrition and whose carbohydrate intake was high. In these instances he assumes previous misuse of alcohol, latent tuberculosis, hidden focal infection, circulatory disturbances or some other endogenous intoxication as the possible cause of the disturbance of liver function.

Signs of liver disturbance were also found in manic-depressive psychosis, senile psychosis, general paresis, in the Korsakow's type of alcoholic psychosis, epileptic psychosis, Huntington's Chorea, and other organic brain diseases, especially of the hepato-lenticular type of degeneration. In most cases there was only increased urobilinuria. Definite evidence of insufficiency symptoms was noted during the depressed phase of manic-depressive psychosis, during epileptic twilight states, in cases with hepato-lenticular degeneration, and also in a number of confused seniles.

Lingjaerde feels that a better knowledge of the liver function may lead to the solution of many psychiatric problems, especially of schizophrenia. The frequency of the positive laboratory findings obtained by him pointing to a liver disturbance is indeed high but he overlooks the fact that the positive findings occurred chiefly during the so-called active phase of a psychosis and it is begging the question whether the liver is at fault during these phases because of a disturbed psychic state, as it is no longer to be denied that the "whole body participates in our elation or misery." In the inactive phases of the psychoses Lingjaerde found practically no abnormal biochemical reactions, probably because after the initial flareup the metabolic processes settle again to normalcy. One wonders what the various tests would show in normal man during his "flareups," if only such an investigation could be carried out.

J. Notkin.

MORTALITY AMONG PATIENTS WITH MENTAL DISEASE. By *Benjamin Malzberg, Ph. D.* (Utica, N. Y.: State Hospitals Press, 1934.)

It has long been the practice of those desiring accurate statistical data in matters pertaining to mental disorders to turn to the statistical bureau of the New York Department of Mental Hygiene. Dr. Malzberg's little book gives us with meticulous detail, those facts and figures concerning mortality from the experience of the New York State Hospitals. The important causes of death in the various psychoses and in age groups in comparison with the general population of the state of New York are presented in tabular form with lucid explanatory paragraphs. Because of the differences of age groups in the hospital and general population, all figures are shown both as crude and standardized so that the comparisons given may be as accurate as possible.

While most of us in mental hospital practice have had definite impressions with regard to certain mortality aspects, Malzberg converts our impressions into exact figures, or in some instances, demonstrates that our impressions were incorrect.

A few high lights are as follows: the death rate in mental hospitals is 4.8 times that in the general population; disorders of the circulatory system are the leading cause of death, although in dementia præcox tuberculosis takes first place; tuberculosis moreover causes about 12 times as many deaths, relatively, in the insane population as compared with general population; diabetes and cancer cause relatively fewer deaths among the mentally ill than the general population; deaths from arteriosclerosis have increased remarkably in the years from 1912 to 1930; decreasing mortality from general paresis since introduction of malaria (and tryparsamide?).

The author is chary about presenting psychiatric observations, evidently preferring to let the figures speak for themselves and for the reader to draw his own conclusions. He ventures the following, however, on page 192: "most striking fact in connection with the mortality of the insane is its excessive rate in comparison with the general population in the ratio of almost 5 to 1." While this ratio may be striking it is certainly not remarkable nor unexpected and, further, shows one of the difficulties inherent in obtaining comparable groups for any statistical study. One would be surprised indeed if the death rate in any hospital did not far exceed that in the general population, whether the hospital be general, tubercular or mental. While beyond the scope of the present study, one feels that a comparison of death rates in various types of hospitals, and between mental hospitals in various states would be a valuable appendix to future editions. This book should find a place in the library of every psychiatrist for the solid facts it contains on all phases of mortality among patients with mental disease.

GEORGE H. STEVENSON.

OUTLINES FOR PSYCHIATRIC EXAMINATIONS. Edited by *C. O. Cheney.* (Utica: State Hospitals Press, 1934.)

This manual is a remodelling of Dr. G. H. Kirby's "Guides for History Taking and Clinical Examination of Psychiatric Cases," published in 1921.

Most of the original material has been retained. Certain essentials, as Kretschmer's "Personality and Physique," have been incorporated as a supplement to the general physical examination; and an outline for the psychiatric examination of children is a welcome addition, together with modifications in the technique of psychiatric examination throughout. The inclusion of the A. P. A. 1934 revised classification, the classification of psychiatric diseases in children, supplemented by the author's explanatory notes on both these sections, as well as the code numbers of the Standard Classified Nomenclature of Disease rounds out a most useful and practical aid to the student and psychiatrist.

C. H. McCuaig,
Toronto.

Speech Pathology. By *Lee Edward Travis.* (New York and London: D. Appleton and Co., 1931.)

The present work is basic for an understanding of speech pathology. There has been an attempt to integrate and to synthesize pertinent neurophysiological concepts, viz.: integration and disintegration of neural levels (Orton), condition of antitropy, principle of gradient (Child), maturation and even postural reflexes. "Dysfunctions of speech arise from a patho-physiological subsoil when there is no sufficiently dominant gradient of activity present in either hemisphere." The idea of neurophysiological dominance pervades the entire study.

A sane, broad attitude is taken toward the etiology of speech disorders, *i. e.*, they are the resultant of a plurality of causes and yet each disorder must be considered as an individual case. The following are discussed in detail (1) heredity, whose significance lies in predisposing the individual toward a bias for a one lead gradient, (2) pathological fetal positions, (3) birth injuries, (4) developmental factors in which the relationship of handedness, eyedness and speech defects are elaborated upon, (5) physical injuries and diseases and (6) general mental deficiency.

The author is most particularly interested in stuttering. An array of data is marshalled to show that in stuttering the speech mechanism functions imperfectly as a sum of parts. This is the primary factor, emotional conflicts are secondary. "The basic cause of stuttering is to be sought in some significant variation in the functional integration of the central nervous system (lack of a sufficiently dominant gradient of excitation) and not in so-called 'mental complexes' and emotional maladjustments." Analyses of normal speech and stuttering based upon much of the author's own research are presented and illustrated with records of action currents and kymographs. Methods for the management of the stutterer are given, the most important of which seems to be to develop strict onesidedness in all motor leads. Although admitting the value of psychoanalysis as an aid in the medical treatment, it is not called upon as much as it would seem to warrant, especially for dynamic psychological interpretations.

The organic disorders of articulation and phonation are considered in the light of central and peripheral deficiencies. Functional disorders are discussed

as aspects of mental deficiency, faulty training and idiopathic defects. The author follows Head's work in aphasia in the chapter on disorders of symbolic formulation and expression.

A glossary, a classification of speech disorders, case histories, an appendix for speech training and seventy illustrations round out this compact work in which the ideas are fluently and succinctly expressed.

JOSEPH J. MICHAELS.

"STERILIZATION? BIRTH CONTROL?" By *Helen MacMurchy, C. B. E., M. D.* (Toronto: Macmillan Co., 1934.)

In this book of one hundred and fifty pages the author has given us a compilation of some of the more recent expressions upon the two much discussed subjects named in the title.

The burden which the chronic dependents—the mental defectives, the psychotics, the criminals, and other smaller groups—place upon the average citizen, forms the starting point of the book. That this burden is increasing is evidenced by the necessity for increased accommodation each year in mental hospitals, prisons, and charitable institutions.

In the first half of the book, sterilization is considered from two viewpoints—benefiting the individual case and benefiting the race, the primary object in both cases being to lighten the burden upon the community. Most of the quotations are from British and Canadian sources. Pre-eminent among them are the passages from the admirable report of the Brock Committee, which was appointed by the British Minister of Health in June, 1932.

Professor Hans Maier is quoted regarding sterilization in Switzerland, where it has been practised for 50 years. An extract from the London Morning Post gives a few of the details of the recently enacted German law providing for the sterilization of the unfit; hereditary diseases in the sense of the law include imbecility from birth, schizophrenia, depression mania, hereditary St. Vitus' dance and grave alcoholism. The Encyclical Letter of Pope Pius XI on Christian Marriage is quoted in excerpts relevant to sterilization. The sexual sterilization acts of the provinces of Alberta and British Columbia are presented in full. It is regrettable that the reports upon the results of sterilization are so meagre. Landman is quoted as to the results of sterilization in California, where it has been practised widely, to the effect that sterilization has not tended to increase promiscuity and venereal disease among the paroled mental defectives, nor has it made them more stable. The author quotes with approval the Brock Committee's report—"The case of legalizing sterilization rests upon the broad principle that no person unless conscience bids ought to be forced to choose between the alternative of complete abstinence from sexual activity or of risking bringing into the world children whose disabilities will make them a burden to themselves and society, ... Sterilization ought to be regarded as a right and not as a punishment."

Among the conclusions, it is stated that in view of the present attitude of the public, compulsion should not enter into the legislation providing for sterilization of the mentally defective and mentally diseased. The need, in

the legislation, of safeguards for the patient, in the way of the right to appeal the Sterilization Board's decision, and for the doctor, in removing the liability to prosecution, is emphasized. Supervision of paroled sterilized mental defectives will not be obviated by the operation of sterilization.

Regarding birth control, an interesting quotation from the British Medical Journal is to the effect that birth control has been practised widely in Holland for many years, and that Holland has the lowest infant mortality rate and the highest birth rate among the countries of Europe. This would appear to negate the statement often made that the decreasing birth rate in many countries, in recent years, is due to the more widespread use of contraceptive measures.

The part that the medical profession should play in this field—abstinence from intercourse as a contraceptive measure, dangers in the use of contraceptives, the organization of birth control clinics, and the relationship between the law and contraceptive practices—are discussed. The author's conclusion is that birth control measures should be undertaken only for medical reasons and under medical care, and should not be considered a matter of course for the bridegroom and the bride.

C. G. Stogdill,
Toronto.

Syllabus of Psychiatry. A Guide to General Orientation. By *Leland H. Hinsie*. With a foreword by *Clarence O. Cheney*. (Utica: State Hospital Press, 1933.)

In the foreword Dr. Cheney states that "the present day tendency is distinctly toward the unification of the various departments of medicine and toward a correlation of their principles. Among these unifying influences is that division called constitutional medicine, which aims to view the individual from all possible aspects. This volume has been written with the idea that psychiatrists should be familiar with the several points of view."

Dr. Hinsie "attempts to assemble many of the important conceptions that have been built around psychiatric disorders and to show within small space some of the most significant attitudes." While he states that Freudian psychoanalysis is an established procedure of merit, he feels that there are psychiatric syndromes in which psychotherapy may be of value but in which it seems quite inadvisable to stress only a psychical approach. The book aims to survey the field broadly and to give a general rather than a specific orientation.

Chapter I deals with constitutional concepts. Its 70 pages are packed with important findings of some 18 well-known scientific writers in different fields that will challenge the reader to investigate these sources more widely. It is a veritable *multum in parvo*—this uncritical review of several schools of thought. The psychobiological standpoint is stressed throughout the work. "In general the ideas expressed come from men of distinction in their several fields." A threefold approach considers, first, ideas from constitutional medicine and studies on heredity; second, emphasizing the psychical side, and, third, research observations.

On the side of "constitution" the author considers particularly the work of: Jennings: The Biological Basis of Human Nature; Stockard:

The Physical Basis of Personality; Pende: Constitutional Inadequacies; Kretschmer: Physique and Character; Draper: Disease and the Man; The Human Constitution; Gates: Heredity in Man; Myerson: The Inheritance of Mental Diseases; Barrett: The Hereditary and Familial Factors in the Development of the Psychoses; Bauer: Pollock, Hoffman, Strecker and others. In this brief space some of the principal conclusions of these men as to constitutional factors and heredity are given. It is exceedingly interesting—to us the most stimulating contribution of the book.

Psychical Concepts dealt with in chapter 2, after a brief historical development of the ideas of pioneer psychiatrists, propounds some of the concepts of Jung (12 pages) and more fully those of Freud (about 30 pages), and closes on the note of psychobiological integration with an outline of Professor Adolf Meyer's "reaction types," and the interpretative statement that abnormal mental conditions are attitudes and reactions of the person as a whole in response to demands for adaptation—an intelligible and workable concept.

Chapter 3 discusses psychophysical concepts more briefly and is based especially upon ideas of Adler, Kempf and Nolan Lewis.

"The actual needs of a well-developed department of mental hygiene form the nucleus of the discussion" of the long chapter of sociological considerations, whose first sub-heading—the Meaning of Psychiatry to the Department of Mental Hygiene—is followed by a systematic presentation in lecture form of most of the various reaction-types described by Dr. Adolf Meyer.

1. Organic in general, and in particular cerebral arteriosclerosis, senile psychosis, neurosyphilis, epidemic encephalitis, alcoholic psychiatric disorders, epilepsy. 2. Psychopathic personality. 3. Schizophrenic reaction. 4. Manic-depressive reaction. 5. Psychoneurotic reactions. Each is described under incidence, age, condition on discharge, general remarks, symptomatology and treatment, and due regard is paid in the last topic to useful suggestions for the family physician, the family and community adjustments. In some of these reactions one questions the value of Freudian interpretations in dealing with symptoms and in treatment. The chapter as a whole, however, has a fund of useful facts carefully systematized.

The final section dealing with endogeny and exogeny is a really small parcel of good things.

A comprehensive list of selected references precedes the index.

Without having experience of actually using this book for teaching purposes one wonders if it may be correctly called a syllabus of psychiatry.

E. P. Lewis,
Toronto.

That Heart of Yours. By *S. Calvin Smith, M.D.* (J. B. Lippincott Company, 1934.)

As the author states the purpose of the book is to supplement and amplify the information which physicians give to a heart patient when time permits and when the person is in a receptive mood. He points out the distinction between heart trouble and troubled hearts. The book is admirably adapted to meet the requirements of patients belonging to the latter group who are

free from organic heart disease but ill and incapacitated in consequence of fear coupled with an anxiety neurosis. In such cases the knowledge and suggestions often are of inestimable value in relieving the fear and anxiety and restoring the functional nervous disorders.

For the patient suffering with organic disease of the heart the author endeavors to instil a feeling of optimism and offers to the patient a more hopeful outlook. Subjects relating to infections, proper rest, exercise, diet, stimulants, baths, diversion and the effects of the emotions and mental stress are all intelligently discussed. The chapter on the psychology of reconstruction contains many suggestions which could advantageously be applied by the physician in the treatment of heart disease.

HARVEY G. BECK.

TEXTBOOK OF ABNORMAL PSYCHOLOGY. By *Roy M. Dorcus and G. Wilson Shaffer.* (Baltimore: The Williams and Wilkins Company, 1934.)

This book, excellent because of its fairness and simplicity of presentation, will undoubtedly prove of value to advanced students in psychology and medimine, for whom, as the authors themselves state, it was written. The authors, Roy M. Dorcus, associate in psychology, the Johns Hopkins University, and G. Wilson Shaffer, psychologist, Sheppard and Enoch Pratt Hospital, and professor of psychology, University of Baltimore, believe the best understanding of abnormal behavior comes through the study of normal reactions.

The first chapter is devoted to the field and scope of abnormal psychology. In the second, third and fourth chapters disturbances of the special senses, the motor system and the association system are clearly and concisely given with an appealingly impartial statement of various theories. In the fifth and sixth chapters desires, feelings, emotions, various theories of sleep, dreams and hypnosis are discussed. The remaining six chapters deal with the classification and treatment of mental diseases, with the eleventh chapter devoted to mental deficiency and mental superiority.

Students will find in the last chapter on psychotherapy a balanced and exceedingly useful presentation of the various schools of psychology and psychiatry. This chapter adds materially to the value of the book since most textbooks usually devote so little space to therapy.

This book, of undoubted real worth, needs to have emphasized the warning of Dr. Ross McC. Chapman appearing in the foreword. He says "neither psychologist or psychiatrist should undertake the treatment of even the mildest neurosis without thorough physical examination in an effort to define possible organic factors" . . . . "the fact remains that one of the most common and swift recourses of the neurotic is to physical symptomatology." The psychologist cannot ignore or adequately weigh such symptoms. He is at a disadvantage, ... "we pass into dangerous territory when we take mental disease out of the hands of the medical profession." "The physician needs all the help he can get in this field." "The professions which may contribute to his assistance are many—nevertheless the directing force must be his."

GRACE BAKER,
Johns Hopkins Hospital.

THE POWER TO LOVE. A PSYCHIC AND PHYSIOLOGIC STUDY OF REGENERATION. By *Edwin W. Hirsch, B. S., M. D.* (New York: Alfred A. Knopf, 1934.)

Havelock Ellis, from the wealth of his experience, declares: "In the great majority of marriages success depends exclusively upon the knowledge of the art of love possessed by the two persons who enter into it."

Bertrand Russell pursues the thought thus: "Very few men or women who have had a conventional upbringing have learnt to feel decently about sex and marriage. . . . . Very few marriages after the first few years are happy."

And Balzac adds the finishing touch when he compares the average husband to an orang-utan trying to play the violin.

Dr. Hirsch, who is associate in urology in the College of Medicine, University of Illinois, has written this book with a view to correcting the situation referred to by Russell and Balzac. It is designed primarily for the instruction of men and is written with the tang of a salt sea breeze. The author has little use for traditional teachings and moralizing tendencies, especially in such matters as the alleged innocuousness of prolonged continence. He keeps to the data of biology and experience as he has found them, and does not consider it useful to refer to spades as teaspoons.

After an introductory chapter dealing with the anatomy and physiology of the sexual mechanism and the psychic aspects of sex, the author goes at once to the main business of his treatise, namely the various aspects of sexual debility in the male, its causes and methods of treatment. Popular fallacies are exposed; the effects of misinformation, conventional prejudices, fears born of ignorance are thoroughly explored; specific and detailed instruction is offered on about all the questions of sex technique that are likely to arise. One chapter is devoted to the subject of psychical impotence; another to frigidity and its relation to impotency. In common with most authorities the author finds that relative frigidity prevails widely, but that it is usually an unnecessary condition due to lack of knowledge and skill on the part of the husband, and of course on the part of the wife as well. In a final chapter are given general advice and principles which the physician will find useful in dealing with various types of patients with sex complaints, how to obtain histories and conduct an examination, how to assist patients in expressing their real difficulties and to teach them to cooperate in their own rehabilitation, how to make them more human and wholesome in matters of sex and life.

Naturally, with the twentieth century plethora of sex literature, it may be difficult to find a topic in this book which has not already been expounded by numerous other writers. The author brings however his own fresh viewpoint and speaks from his own rich experience. His style is arresting and he vigorously drives home his conclusions. He is not too much concerned with the squeamishness of the squeamish; he has written a good honest book. And there are of course valuable citations from the literature, including ample quotations which give the reader access to documents not readily available, for example, Pouillet's treatise on *Onanism in the Female*, and Morgagni on *The Seats and Causes of Diseases*. There are curious gleanings from history and excerpts

from the lore of other lands; even the *Kama Sutra* is drawn upon for its store of erotologic maxims, although here the author exercises his discretion.

When one reads in the preface the author's summing up: "I have provided a key to the enigmatical problem of sexual incompetency," one may remark to oneself—"a fairly confident statement"; but after reading the book one is inclined to agree that the author has done just that.

But there will be those who might wish that composers of manuals of physical sexercises and guide-books to Cytherea would dedicate them somehow otherwise than to their wives. At any rate it indicates how far we have come since the age of Pericles.

C. B. F.

PSYCHOPATHOLOGY. A SURVEY OF MODERN APPROACHES. By *J. Ernest Nicole, L.M.S.S.A., D.P.M.R.C.P. & S.* (Baltimore: William Wood and Co., 1934.)

This is the revised and enlarged second edition of Dr. Nicole's outline which first appeared in 1930. It is not a textbook of psychopathology, but rather a series of condensed statements of various contemporary systems or schools and is designed primarily for orientation purposes and as a brief source book for ready reference.

The following chapter headings will indicate the scope of the book: Morton Prince; Freud's Psychoanalysis; Adler's Individual Psychology; Jung's Analytical Psychology; River's Theories; Watson's Behaviorism; Kempf's Psychopathology; Berman's Endocrine Theories; Biochemical and Physiological Contributions; Kretschmer's Constitutional Approach; Ethnological and Sociological Evidence; The Eclectics and Characterologists; The Position in Psychology; Applied Psychopathology.

For the most part Nicole avoids any critical appraisal of the several gospels which he recapitulates, permitting each proponent to speak for himself and the reader to form his own opinions. He does find Adler however somewhat too confident of his method; Kempf, he suggests, has in England been considered somewhat cumbersome in terminology and classification, with "too much neurological tautology"; Berman's views are referred to as "highly conjectural," his outlook as "over-enthusiastic and insecure," although it may yet offer "a starting point for future investigations, the results of which might provide some of the much needed links between the psychological method and the physiological means of investigation."

Three appendices deal respectively with the Concept of the Ego; Type Psychology; Psychopathology and the Herd Instinct.

An excellent 23-page bibliography contains the important works which have appeared in, or have been translated into, English since 1900.

Nicole has surveyed a tremendous field in his 242 pages of text (exclusive of bibliography and indices) and has done it particularly well. To the reader unfamiliar with the subject his statements will probably sometimes appear too condensed to leave a full and clear impression. The book is however a valuable introduction and a reliable guide to present-day trends in the mental sciences; and supplies the necessary indications for further reading in any desired direction.

C. B. F.

DR. ARTHUR F. KILBOURNE

UNIV. OF MICH.

In Memoriam.

ARTHUR FOOTE KILBOURNE.

1858-1934.

Dr. Arthur Foote Kilbourne, whose ancestors settled at Weathersfield, Conn., in 1636, was born January 5, 1858, in Keokuk, Ia. He was graduated from the medical department of the University of the City of New York in 1883, and at once served his apprenticeship in state hospital work under an excellent tutor, another of our past Presidents, Dr. A. E. Mac Donald, the "Czar of Ward's Island," as he was known in those days. However, Dr. Kilbourne's heart was in the Middle West, and the following year he obtained a position on the staff of the St. Peter State Hospital, St. Peter, Minn. After four years of good work as assistant physician at St. Peter, Dr. Kilbourne was appointed superintendent of the Rochester State Hospital, June 6, 1889. He continued to hold the position of superintendent of the Rochester State Hospital well and honorably for 45 years and died November 30, 1934, while still occupying that position.

Dr. Kilbourne was progressive of spirit, and within a year of his appointment at Rochester State Hospital, on the advice of another of our past presidents, Dr. Peter M. Wise of St. Lawrence State Hospital in New York, sponsored a training school for nurses at a time when few superintendents had yet considered such an innovation in state hospital management. Progressive as he was in every field of institution life for more than four decades, all State officials acknowledge that the institution's splendid development was due entirely to Dr. Kilbourne's ability and energy.

His interests were not confined to state hospital work alone; at the time of his death he was past president of the Olmstead County Medical Society and was a member of all leading local, state and national medical associations. In his own city he was a member of the Library Board, for 25 years, he was a senior warden

in the Calvary Episcopal Church, he was active in Masonic circles and for many years was a member of the Rotary Club.

We, of this Association, are particularly interested in the fact that Dr. Kilbourne became a member of the American Psychiatric Association in 1890, took an active part in its work, attended all its meetings without fail, and at the time of his death was on its honored list of life members. He was president of the American Psychiatric Association, 1908-1909, and at the annual meeting of the Association in New York, 1933, his last meeting with this Association, he was one of the eight former presidents honored at the dinner.

The name of Kilbourne is familiar in our country, always with honor, and it is worthy of passing notice that Dr. Edwin A. Kilbourne, superintendent, Elgin State Hospital 1871-1890, was a cousin of Dr. Arthur Kilbourne, as well as his brother-in-law.

Dr. Kilbourne married Miss Ella Donahower while still a staff member of St. Peter, October 8, 1888. Mrs. Kilbourne is residing in Los Angeles, Calif., while the two children, Mr. A. D. Kilbourne and Miss Katharine Kilbourne, are residents of Chicago.

To those of us who knew Dr. Kilbourne well, the foregoing seems largely a recitation of the facts of his official life and should be supplemented to complete a better picture of his true personality. Dr. Kilbourne was a man of loyal purpose to his friends and to his life's work. He was friendly, of kindly spirit, full of understanding and sympathy. For this reason his field of friends included many in all walks of life, something that should be the ambition of all men. It was very fitting therefore that the active pall bearers at Dr. Kilbourne's funeral consisted of six employee associates at Rochester State Hospital for 35 years or more, a leader and friend laid away by faithful compatriots; the honorary pall bearers, men who had honored and respected him and his work, included Dr. W. J. Mayo, Dr. C. H. Mayo, Dr. E. S. Judd and others from the Mayo Clinic and the local Medical Society and a number of the civic leaders of Rochester. The influence of the breed of men of which he was one has made civilization what it has been up to this time; no greater tribute can be paid the memory of any man than to appreciate fully the meaning of this wholesome fact.

SIDNEY D. WILGUS.

RENÉ SEMELAIGNE.

1855-1934.

The memorial of Dr. Semelaigne prepared by M. René Charpentier, editor of *Annales Medico-Psychologiques,* and which appeared in the December 1934 number of that publication, is here reproduced by the kind permission of the author.

With the death of René Semelaigne has passed a great figure in French psychiatry. His obsequies marked by the simplicity he desired, concluded fittingly a life characterized by modesty and benevolence and gave evidence of the place he held in the hearts and minds of a multitude of colleagues and friends.

René Semelaigne was born December 12, 1885, at Neuilly-sur-Seine. His father, Armand Semelaigne, who was president of the Société Médico-Psychologiques in 1886, was the grandson of Casimir Pinel; the latter was the son of Louis Pinel and a nephew of the great Pinel.

After serving as interne in the hospitals of Paris and at the Salpêtrière in 1883, Semelaigne became chief of the psychiatric clinic in the Faculty of Medicine in 1886.

Having been reared in the familial atmosphere of eminent psychiatrists and accustomed to the life of the hospital directed by his father, Semelaigne had laid an excellent foundation for his medical and psychiatric career. In 1898 he succeeded his father as medical director of the Maison de Santé Saint-James, continuing in this capacity until 1921 when owing to changing local conditions the hospital was closed. In this historical locality Casimir Pinel had established in 1884 the hospital originally founded by him in Paris in 1829. Guardia refers to Casimir Pinel as "un esprit cultivé et distingué, ouvert aux belles idées et aux belles choses. Il se plaisait dans la compagnie des honnêtes gens. Il savait les attirer chez lui et, ce qui est moins commun, il savait les retenir."

Semelaigne's psychiatric interests were of great scope and diversity; but the natural direction of his mind, his vast erudition and the milieu in which he had lived, together inclined him to devote a large portion of his time to the history of French psychiatry. Among his works may specially be mentioned *Restraint and Non-Restraint* (1890), *Legislation Concerning the Insane in the British*

Isles (1892), *Medico-legal Studies of Clark-Bell* (1893), *The Libro del Comando* (a case of folie à cinq, 1893), *The Clinical Varieties of Persecutory Psychosis* (1894), *Ambulatory Automatism* (1894), *Brain Surgery in Mental Diseases* (1895), *Homicide from a Standpoint of Criminal Anthropology* (1896), *A Case of Hallucinatory General Paresis* (1903), *The Physiognomy of the Insane* (1930). From 1895 to 1914 he contributed regularly to the *Journal of Mental Science* reviews of French literature. Many of his articles appeared in the *Annales Medico-Psychologiques,* the journal which was nearest his heart, and to which as a member of the editorial board he rendered invaluable service. His last contribution was published in the July 1934 number of the *Annales Medico-Psychologiques.* Turning now to the remarkable work of Semelaigne as historian and critic, beginning with his Doctor's thesis *Philippe Pinel and His Work from the Viewpoint of Mental Medicine* (1888) we note the following,—*Centenary of the York Retreat* (1892), *Great French Alienists* (1894), *A Hospital Under the Monarchy of July* (1911), *Alienists and Philanthropists, The Pinels and the Tukes* (1912), *Bayle and the Works of Charenton* (1922), *Elegy of Delasiauve* (1925), *Elegy of Ball* (1926), *The Precursors of Pinel* (1926), *Anniversary of the Death of Pinel* (1926), *The Pioneers of French Psychiatry* (a 2 volume work 1930 to 1932).

These studies of Semelaigne embrace the entire history of French psychiatry. Recently (1932 and 1934) appeared in the *Annales Medico-Psychologiques* his *Souvenirs d'un passé récent,* which may be regarded as appendices to the two volumes of biographies above mentioned.

These volumes he dedicated to the young men, whose efforts he loved to encourage, with the wish that they might know how to unite the work of the present hour and hope of the future with a reverence for things past. Written in pure and distinguished French these monographs are remarkable for their clear, accurate and vivid portraitures, their careful documentation and their impartiality. They evoke now an epoch, now a character, and again a courteous rivalry of ideas; they abound in personal recollection, new points of view and picturesque details. This noteworthy publication was the fruit of much labor and establishes its author as the authentic historian of French psychiatry.

Semelaigne was a member of numerous foreign societies including the Royal Medico-Psychological Association, The Royal Society of Medicine of London and The American Psychiatric Association. He had occupied the presidency of all the psychiatric societies of France—the Société Médico-psychologique in 1913; the Société Clinique de Médicine Mentale in 1920; the Société de Psychiatrie de Paris 1924; the Congrès des Aliénistes et Neurologistes de France in 1926. At the time of his death he was president of the Association Mutuelle des Médecins aliénistes de France, and president of the Œuvre de patronage et asile founded by Falret, for the convalescent indigent insane from the public hospitals of the department of the Seine.

To these professional and benevolent activities he devoted himself to the very last. During the closing weeks of his life when the serenity of his conversation from time to time almost inspired hope against hope, on each of my visits he would talk to me about our societies, about coming meetings and the future welfare of the benevolent foundations which were so dear to his heart.

His death on November 16, 1934, occurred at his home in Auteuil, to which he had retired in 1921. The nobility of his mind, the breadth of his culture, the rectitude of his judgment, the sincerity of his religious faith, his lofty patriotism, ready for the hardest sacrifice, the tolerance and indulgence of his friendship, the evenness of his spirit and his active kindliness and the dignity of his life will live in the hearts and minds of those who have known him, the beneficent memory of a noble soul. With the cult of the past which he saved from forgetfulness René Semelaigne bequeathed to us who loved and mourn for him the noble example of his life.

RENÉ CHARPENTIER.

EDMUND A. CHRISTIAN.

1857-1935.

The death of Dr. Edmund A. Christian on February 5, 1935, at Pontiac, Michigan, occurred scarcely twenty-four hours after his retirement from active service as medical superintendent of the Pontiac State Hospital, a position he had filled for forty-one years. His death, which was unexpected, was caused by heart disease.

Dr. Christian was born in Detroit, Michigan, on September 7, 1857. He was educated at the University of Michigan, receiving the A. B. degree in 1879 and the M. D. degree in 1882. He joined the staff of the Pontiac State Hospital in 1882, soon after his graduation, and became medical superintendent in 1894. In 1906, the University of Michigan awarded him the honorary A. M. degree. It was his unique distinction to have spent nearly fifty-three years in the practice of psychiatry in the same institution. On his retirement, he was named medical superintendent, emeritus, and it had been expected that he would continue to act in an advisory capacity.

In 1894, Dr. Christian married Miss Augusta Baldwin who survives him, together with three daughters: Mrs. Robert E. White, Mrs. John Clark and Mrs. John Pendergast.

At the time of his death, he was a member of the Oakland County Academy of Medicine, the Michigan State Medical Society and the American Medical Association. He was a life member of the American Psychiatric Association. He made many contributions to psychiatric literature.

Dr. Christian's distinction as a psychiatrist was equaled by his ability as an administrator. The institution which he served so long stands a monument to his stewardship. He held to an unusual degree the affection of his community, which came to look upon him as its leading citizen. Not many men will be so sincerely missed.

GEORGE F. INCH.

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